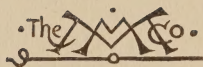


Division LB1025
Section P17

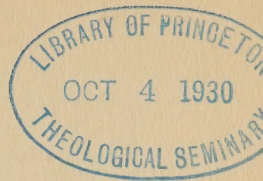
PROGRESSIVE PRACTICES IN
DIRECTING LEARNING



THE MACMILLAN COMPANY
NEW YORK • BOSTON • CHICAGO • DALLAS
ATLANTA • SAN FRANCISCO

MACMILLAN & CO., LIMITED
LONDON • BOMBAY • CALCUTTA
MELBOURNE

THE MACMILLAN COMPANY
OF CANADA, LIMITED
TORONTO



PROGRESSIVE PRACTICES
IN
DIRECTING LEARNING

By ✓
ANTHONY RAY PALMER
University of Pittsburgh

New York
THE MACMILLAN COMPANY
1930

COPYRIGHT, 1929,
By THE MACMILLAN COMPANY.

All rights reserved — no part of this
book may be reproduced in any form
without permission in writing from
the publisher.

Set up and electrotyped. Published July, 1929. Reprinted
March, 1930.

• PRINTED IN THE UNITED STATES OF AMERICA •

TO
BARBERRY

PREFACE

After attending a series of lectures, a young, inexperienced teacher remarked, "The lectures were very interesting and the principles discussed seemed important, but I do not know any more about putting the principles into practice than I did before." With the above remark in mind, the present volume has been written for the specific purpose of giving definite help to the classroom teacher by bridging the gap between general principles and their practical application.

This book is a product of the author's experience as a teacher in directing the learning activities of pupils in the public school and students in the university. The topics treated and the materials selected have been chosen with the one thought in mind—to help the teacher direct the learning activities and individualize them in order to meet the individual needs of each pupil entrusted to her care. For this reason a large amount of illustrative material in the form of experiments, scientific studies, and progressive practices in teaching has been included in the present volume.

For the student in teacher training classes this book provides material that will broaden her horizon and stimulate thought and discussion. For the inexperienced or untrained teacher it provides practical materials to serve as thought patterns as she thinks about her own pupils. For the experienced and well-trained teacher it offers a sound basis for constructive study of the problems encountered in directing the learning activities of the pupils in her classes.

To summarize, it is the purpose of this book to help teachers direct the learning activities of their pupils through the use of progressive practices applicable anywhere under present conditions.

The writer wishes to acknowledge the assistance rendered by Mae Weber Palmer, who read the book critically in manuscript and offered many valuable suggestions. She was untiring in her help and unwavering in her faith as to the finished product. Without her inspiration and encouragement the book would have remained only an unfinished possibility.

ANTHONY RAY PALMER

University of Pittsburgh

CONTENTS

	PAGE
PREFACE.....	vii
INTRODUCTION.....	I
CHAPTER I. SETTING UP LEARNING PRODUCTS.....	9
Learning is a transformation of processes.....	9
The new way of behaving is a learning product.....	10
The learning product contributes to personality.....	10
Illustration of learning products.....	10
Types of learning products.....	11
a. Ability to do.....	11
b. Understanding.....	13
c. Personal acceptance of worth and value.....	14
Learning products in terms of pupil activity.....	16
Setting up learning products.....	17
Summary.....	21
Suggestions and study helps.....	21
Helpful references.....	22
CHAPTER II. PROVIDING THE LEARNING ACTIVITIES..	23
The learning activity.....	23
a. Learning activities that produce ability to do.....	24
1. A correct start.....	25
2. Continuation of the learning activity.....	25
b. Learning activities that produce understanding.....	27
1. Learning activities consisting of perceptual experiences.....	27
2. Learning activities consisting of reading.....	29
3. Learning activities of thinking or problem solving.....	32
4. Learning activities involving creative self-expression..	34
c. Learning activities that produce personal acceptance of worth and value.....	35
1. The ability to do.....	35
2. The understanding that comes through an intelligent attitude.....	36
3. The perceiving of personal relationship.....	36
Examples of learning activities focussed upon the learning products.	38

	PAGE
Summary.....	46
Suggestions and study helps.....	46
Helpful references.....	46
CHAPTER III. DIRECTING THE LEARNING ACTIVITIES.	48
Directing the learning activities.....	48
Value of directing the learning activities.....	48
Methods of directing the learning activities.....	52
a. Ability to do.....	52
1. Getting a correct start.....	52
2. Repetition to the point of automatism.....	54
3. Summary.....	56
b. Understanding.....	56
1. Perceptual experiences.....	57
2. Reading.....	59
3. Problem solving.....	62
4. Creative expression.....	63
5. Summary.....	64
c. Personal acceptance of worth and value.....	65
1. Activities involving ability to do.....	65
2. Activities involving understanding.....	65
3. The perceiving of personal relationship.....	65
4. Summary.....	68
Suggestions and study helps.....	68
Helpful references.....	69
CHAPTER IV. RECOGNIZING INDIVIDUAL DIFFERENCES.	70
Individual differences among pupils.....	70
Examples of individual differences.....	72
a. Individual differences in ability to do.....	72
1. Arithmetic.....	72
2. Handwriting.....	72
3. Beginning reading.....	73
4. Reading.....	74
5. Spelling.....	76
b. Individual differences in understanding.....	77
1. Concept test.....	77
2. English composition.....	80
3. English.....	82

CONTENTS

xi

	PAGE
4. English literature.....	83
5. Vocabulary.....	84
c. Individual differences in personal acceptance of worth and value.....	87
Leisure-time reading.....	87
Summary.....	88
Suggestions and study helps.....	88
Helpful references.....	89
 CHAPTER V. INDIVIDUALIZING THE LEARNING ACTIVITIES.....	90
Value of individualizing the learning activities.....	90
a. Reading, grade IV.....	90
b. Reading, grade IV.....	91
c. English.....	93
Basis for individualizing the learning activities.....	97
The exploratory test.....	97
a. The value of the exploratory test.....	98
b. The content of the exploratory test.....	99
c. Examples of exploratory tests.....	101
1. Tests focussed upon the ability to do.....	101
2. Exploratory tests focussed upon understanding.....	106
3. Test focussed upon the personal acceptance of worth and value.....	110
Methods of individualizing the learning activities.....	111
Summary.....	113
Suggestions and study helps.....	113
Helpful references.....	113
 CHAPTER VI. FOCUSSING THE ATTENTION OF THE PUPIL.....	115
The need for focussing the pupil's attention upon the learning product.....	115
The value of focussing the attention of the pupil upon the learning product.....	117
Methods of focussing the attention of the pupil upon the learning product.....	118
a. Presentation of the learning product.....	118
Examples of presentations.....	119
b. Use of directed-learning questions.....	132

	PAGE
1. The value of directed-learning questions.....	133
2. Examples of directed-learning questions.....	134
Summary.....	141
Suggestions and study helps.....	141
Helpful references.....	142
 CHAPTER VII. INCREASING THE EASE OF LEARNING.....	143
Increasing the ease of learning.....	143
a. Ease of learning is increased by transforming the meaning of the material.....	143
1. Sentences and disconnected words.....	143
2. Poetry and digits.....	144
3. Prose.....	145
4. Rate of forgetting.....	145
b. Ease of learning is increased by observing points of relation- ship between one experience and another.....	147
c. Ease of learning is facilitated by increasing the number of attentive repetitions of the learning activity.....	149
d. Ease of learning is increased by relating the learning activity to the child's experience and activities.....	152
e. Ease of learning is increased by intensifying the presentation of the learning activity.....	153
Summary.....	156
Suggestions and study helps.....	157
Helpful references.....	157
 CHAPTER VIII. USING VISUAL MATERIAL AS AN AID IN LEARNING.....	158
The growth of visual education.....	158
Visual devices and the learning process.....	158
What is meant by visual aids.....	158
The school museum.....	159
Arousing interest.....	159
Sources of material.....	159
Care of visual material.....	160
Material from local industries.....	160
Magazines and pictures.....	160
Mounted specimens.....	160

CONTENTS

xiii

	PAGE
Value to pupil of collecting	161
Visual material provides ease in learning	161
a. The use of association	162
b. The use of intensity	164
c. The use of repetition	165
Individual differences	167
Individual and group activities that grow out of the use of visual material	168
Summary	169
Suggestions and study helps	170
Sources of visual material	170
 CHAPTER IX. TESTING FOR EVIDENCE OF THE LEARNING PRODUCT	 171
The purpose of a test	171
The basic principle in test construction	171
Evidence of the learning product	172
a. The exploratory test	172
b. The attainment test	172
Examples of tests	173
a. Tests focussed upon the learning product ability to do	173
b. Tests focussed upon the learning product understanding	177
c. Tests focussed upon the learning product personal acceptance of worth and value	186
Summary	194
Suggestions and study helps	195
Helpful references	196
 CHAPTER X. DIAGNOSING THE PUPIL'S DIFFICULTIES	 196
The importance of diagnosis	196
What diagnosis is	196
Guiding principles of diagnosis	197
a. Learning products set up	197
b. Factors that condition learning	197
1. Deficiencies in education	198
2. Poor methods of work and study	198
3. Mental disabilities	198
4. Environmental conditions	199
5. Difficulties due to personality traits	199

	PAGE
6. Physical disabilities.....	200
7. Difficulties due to psychophysical disabilities.....	200
c. Study of the pupil.....	200
1. Arithmetic.....	201
2. Reading.....	203
3. Sustained application in study.....	207
d. Remedial instruction.....	207
e. Record of the pupil's progress.....	209
Summary.....	209
Suggestions and study helps.....	210
Helpful references.....	210
CHAPTER XI. GROUP DIAGNOSIS.....	211
Arithmetic—grade IV.....	211
a. The test.....	211
b. Tabulation of results.....	212
c. Diagnosis of results.....	212
d. Remedial work.....	215
Algebra—high school.....	215
a. The test.....	215
b. Tabulation of results.....	217
c. Diagnosis of results.....	217
d. Remedial work.....	217
Composition—grade VI.....	218
a. The test.....	218
b. Tabulation of results.....	220
c. Diagnosis of results.....	221
d. Remedial work.....	221
Handwriting—grade VI.....	224
a. The test.....	224
b. Tabulation of results.....	224
c. Diagnosis of results.....	224
d. Remedial work.....	224
Punctuation—college students.....	225
a. The test.....	225
b. Tabulation of results.....	228
c. Diagnosis of results.....	229
d. Remedial work.....	229

CONTENTS

xv

	PAGE
Language—grade VII.....	229
a. The test.....	229
b. Tabulation of results.....	230
c. Diagnosis of results.....	230
d. Remedial work.....	230
Reading—grade III.....	230
a. The test.....	232
b. Tabulation of results.....	232
c. Diagnosis of results.....	234
d. Remedial work.....	234
Reading—grade IV.....	235
a. The tests.....	235
b. Tabulation of results.....	235
c. Diagnosis of results.....	235
d. Remedial work.....	236
Suggestions and study helps.....	237
Helpful references.....	237
 CHAPTER XII. INDIVIDUAL DIAGNOSIS.....	239
Arithmetic—grade VI.....	239
a. The test.....	240
b. Tabulation of the scores.....	241
c. Diagnosis.....	242
1. Addition.....	242
2. Subtraction.....	242
3. Multiplication and division.....	242
d. Remedial work.....	243
Algebra—grade IX.....	243
a. The tests.....	243
b. Tabulation of the scores.....	243
c. Diagnosis.....	244
d. Remedial work.....	244
Ancient history—grade X.....	245
a. The tests.....	245
b. Tabulation of the scores.....	245
c. Diagnosis.....	246
d. Remedial work.....	246
Study habits in English—grade X.....	247

	PAGE
a. The tests	248
b. Tabulation of the scores	251
c. Diagnosis	251
d. Remedial work	252
English literature—grade X	253
a. The tests	253
b. Tabulation of the scores	253
c. Diagnosis	253
d. Remedial work	254
Handwriting—grade VI	255
a. The tests	255
b. Tabulation of the scores	256
c. Diagnosis	256
d. Remedial work	256
Reading—grade III	256
a. The tests	256
b. Tabulation of the scores	258
c. Diagnosis	259
d. Remedial work	259
Reading—grade IV	259
a. The tests	259
b. Tabulation of the scores	259
c. Diagnosis	261
d. Remedial work	261
Reading—grade VIII	262
a. The tests	262
b. Tabulation of the scores	262
c. Diagnosis	262
d. Remedial work	263
Spelling—grade II	265
a. The tests	265
b. Tabulation of the scores	265
c. Diagnosis	266
d. Remedial work	266
Spelling—grade X	267
a. The tests	267
b. Tabulation of the scores	267

	PAGE
c. Diagnosis.....	267
d. Remedial work.....	267
Suggestions and study helps.....	269
Helpful references.....	269
CHAPTER XIII. SHOWING PROGRESS TOWARD THE	
LEARNING PRODUCT.....	270
The progress chart.....	270
Value of knowing one's progress.....	270
The basic principles underlying progress charts.....	274
a. Definite learning products set up.....	274
b. Initial score established.....	274
c. Extent-of-progress score.....	275
d. A graphical form.....	275
Illustration of a progress chart.....	275
Examples of progress charts.....	277
a. Indication of task completed.....	278
1. Attendance in kindergarten.....	278
2. Free work period in grade III.....	278
3. Arithmetic in grade IV.....	279
4. Language exercises in elementary grades.....	280
b. Indication of right and wrong answers.....	282
1. Arithmetic in grade V.....	282
2. Spelling in grade III.....	283
c. Indication of number of pupils missing each part of a test.....	286
Spelling in grade VI.....	286
d. Indication of monthly scores.....	288
1. Arithmetic in grade IV.....	288
2. Reading in grade IV.....	289
3. Reading in grade V.....	289
e. Graphical representation of scores.....	289
1. Bank deposits.....	289
2. Reading in grade IV.....	291
3. Handwriting in grade V.....	292
4. Composition in elementary grades.....	293
Suggestions and study helps.....	294
Helpful references.....	295
Index.....	297

PROGRESSIVE PRACTICES IN DIRECTING LEARNING

INTRODUCTION

Significance of the title. The title *Progressive Practices in Directing Learning* indicates that certain practices in teaching are considered by the writer to be more progressive than others. Such practices are deemed progressive because they are derived from and based upon scientific studies and investigations of the learning process. These practices have been found effective in actual classroom situations. They are presented in the present volume as a Learning-Product Technique for directing the learning activities of each pupil as an individual, and of the class as a group.

Preview. In the pages immediately following is a preview of the practices that make up the Learning-Product Technique. Each of the topic headings of the preview presents one of the practices and corresponds to one of the chapter titles of the book.

Setting up learning products as new ways of behaving to be attained by the pupil.¹ All learning is a change, a growth, a transformation of processes, that results in a new way of behaving. Such a transformation of processes, since it occurs in the one who engages in the learning process, is properly called a learning product. The learning product is developed in the pupil as he perceives, reads, thinks, performs acts of skill, or gives expression to a creative inner urge. The presence of the learning product is evidenced only in the pupil's new way of behaving.

¹See Chapter I for a more complete treatment.

There are three general types of learning products that may be set up as ways of behaving to be attained by the pupil: (a) ability to do, (b) understanding, and (c) the personal acceptance of worth and value. Of these three general types of learning products, the one called "personal acceptance of worth and value" is the most important, the most vital. It is the one learning product that should be emphasized above all others.

Providing learning activities that will produce the learning products.² The true learning process is always characterized by activity on the part of the pupil. This is known as the principle of self-activity and means that the pupil becomes intelligent only through his own activities. The stimulus, or learning situation, provided by the teacher is influential in determining the pupil's learning only through the opportunity for activity that it provides.

The function of the teacher and the function of the pupil are separate and distinct yet closely related and interwoven. The function of the teacher is to set up desirable learning products as new ways of behaving and to provide and direct learning activities that will produce each learning product. The function of the pupil is to engage in those learning activities that will enable him to attain the desired learning products. The learning product is the way of behaving, the learning activity provides opportunity for practice in it. Hence the learning activities should always be focussed directly upon the learning product.

Directing the learning activities of each pupil toward attainment of the learning product.³ The differences in the final achievement of pupils are due to differences in their progress of learning. Some pupils learn rapidly, others slowly, but

²See Chapter II for a more complete treatment.

³See Chapter III for a more complete treatment.

the ability to learn is present in every normal child. A pupil stumbles along or learns economically according as his learning activities are skillfully directed toward the learning products. Setting up new ways of behaving as learning products and providing learning activities that will produce the new ways of behaving are not sufficient. The learning activities of each pupil must be directed toward attainment of the ways of behaving.

Recognizing that at any given moment individual pupils have progressed to different levels of development.⁴ Differences between individual pupils may be attributed not to inability to learn but to differences in their progress of learning. At any given moment, individual pupils are on different levels of development. Each pupil must be thought of individually as being somewhere along the line of a progress curve. The results from a test simply indicate the level of development to which the pupil had progressed at the time of the test. The test scores are evidence from which may be inferred the individual progress that each pupil has made toward attainment of certain learning products. Such differences in progress exist and must be recognized and understood by the teacher.

Individualizing the learning activities to meet the needs of each pupil.⁵ In order to meet the wide variations of pupils in their progress toward attainment of ability to do, understanding, and personal acceptance of worth and value, the learning activities must be individualized to meet the individual needs of each pupil. Valuable time is wasted when a pupil is required to do a given piece of work regardless of that pupil's particular needs and interests. In order to teach the pupil what he does not know, the learning activities

⁴See Chapter IV for a more complete treatment.

⁵See Chapter V for a more complete treatment.

should be individualized to meet his needs. One basis for doing this is the exploratory test. The exploratory test is given just preceding the presentation of the learning product. It is used, as its name implies, to explore the experiential background of the pupil and determine his needs as related to the learning product. When the needs of the pupils are determined, then the learning activities of each pupil can be individualized to meet these needs. Pupils who are found to have progressed to a high level of development should be given *enrichment projects* broadening in their nature and extending over a long learning period, one, two, or three months in length depending upon the maturity of the pupil.

Focussing the attention of the pupil upon the learning product.⁶ The attention of the pupil should always be focussed upon the new learning product to be attained. This is because the nature of the response made in a learning activity is determined chiefly by the pupil's mental set. If the pupil has his mind centered upon the learning product and is eager to attain it, the learning process becomes effective. If his mind is not focussed upon what he is to do, the learning process will be ineffective and unfavorable to economical learning.

Controlled experiments have shown the value of focussing the pupil's attention upon the learning product by means of the presentation lesson and the directed-learning questions. The presentation lesson is undertaken just as soon as the teacher is certain that exploration of the pupil's background of experience is completed. The chief purpose of the presentation lesson is to convey to the pupil a clear understanding of the learning product and the way to attain it. All minor details, therefore, are discarded and the teacher develops in broad terms the main points of the learning product.

⁶See Chapter VI for a more complete treatment.

The directed-learning questions consist of a list of questions to direct the pupil's learning activities and focus them directly upon the learning product to be attained. Beginning early in the grades such directed-learning questions should be short, simple questions. Higher in the grades the questions should be accompanied with library references on the source material and with enrichment projects for individual pupils. By the end of high school there should be a diminution of need on the part of the pupil for such questions. By that time the pupil should have become more and more self-responsible, having been taught how to direct his own learning activities.

Increasing the ease of learning through formation of helpful associations.⁷ As the teacher guides the pupil in the formation of the learning product there are certain techniques she may use to increase the ease of learning. Among these is the use of association. Association is concerned primarily with transforming the meaning of a situation, observing relationships between situations, increasing the number of attentive repetitions, and relating the learning activities to the interests and needs of the pupil.

The process of making associations is constantly going on in the mind of the pupil. Some of the associations may be useful, others may be harmful. The problem that confronts the teacher is that of directing the pupil in his learning activities so he will make only those associations that are useful and helpful.

Using visual material as an aid in learning.⁸ Progressive practices in directing learning necessarily include the use of visual material. As a teaching device and as an aid in learning its value cannot be supplanted. Visual instruction

⁷See Chapter VII for a more complete treatment.

⁸See Chapter VIII for a more complete treatment.

means not only the use of slides, motion pictures, and stereographs, but the use of all objects that are related to the learning product being developed. A teacher need not view this phase of the work in dismay, for much visual material may be obtained free or at a small cost.

The law of association is brought into play every time visual material is used, thus increasing the ease of learning. All visual material is rich in perceptual value, an important basis for the attainment of understanding. Instruction is always enriched and made more meaningful by the use of concrete illustrations. Visual material used in the presentation and development of a learning product supplies vivid perceptual impressions. The intensity of such perceptual experiences tends toward permanent retention of the knowledge gained. Ample and varied opportunity is presented for repetition of the perceptual learning activity and repetition is an important principle in creating lasting impressions.

An important value attached to visual aids is that of helping to determine individual differences among pupils. Through the use of visual illustrations a pupil's special ability, hobby, or interest may be disclosed, thus providing a new avenue for individualizing the instruction in order to meet such ability or interest.

Testing for evidence of the presence of the learning product.⁹ All learning is a self-active process on the part of the learner and should produce desirable and worth-while ways of behaving in the pupil. These ways of behaving are developed through opportunity for self-actuated pupil activities. It follows, therefore, that the purpose of a test is to yield evidence from which one may infer the presence or absence of the learning product. In order to furnish this evidence the test must be focussed directly upon the learning product.

⁹See Chapter IX for a more complete treatment.

Evidence of the presence or absence of the learning product may be secured by means of the exploratory test and the attainment test. The attainment test is given after a period of teaching and study. A good technique is to use the same test both as an exploratory test and as an attainment test. This is because both tests are for the same purpose, to disclose evidence of the presence or absence of the learning product.

If the test gives evidence from which one may infer that the pupil has attained the learning product, then the pupil should be given an *attainment* mark (commonly called a passing mark). If the test gives evidence from which one may infer that the pupil has not attained the learning product, then the pupil should be given a mark that shows the extent of progress.

Diagnosing the pupil's difficulties and applying remedial instruction.¹⁰ One of the important responsibilities of the classroom teacher is diagnosis of the cause of difficulty with the subsequent application of remedial instruction. Diagnosis is not a strange, mysterious device but is simply a study of the pupil as he works, with an analysis of his difficulties and errors, followed by the proper remedial instruction applied at the point of difficulty or error.

All diagnosis is a form of testing and may be applied to a class or to an individual. In either case, whether the diagnosis be group or individual, the purpose of the diagnosis is to gain some knowledge that will help the pupil in his progress toward attainment of the learning product. The value of diagnosis is in revealing the pupil's weaknesses and difficulties. When these are revealed, remedial instruction for their removal can follow.

Recording the extent of progress toward the learning

¹⁰See Chapters X, XI, and XII for a more complete treatment.

product.¹¹ An important factor in learning is to motivate it by means of a record of the learner's progress. Few persons like to work blindly. For that reason a pupil should always know his progress toward the learning product. Experimental studies have shown that when a pupil knows his record, whether that record be good or poor, his learning is facilitated.

A progress chart, as its name implies, is a chart that shows the progress of the pupil, or a group of pupils, toward attainment of the learning products. There are various forms of progress charts that may be used. There are charts on which final achievements are indicated, charts that show errors only, charts that show both the right and wrong answers, as well as charts that are more or less purely graphical in their nature. A definite representation of the pupil's record in the form of a progress chart is a valuable aid in directing the learning activities.

Summary. These become, then, the practices that make up the Learning-Product Technique. Upon this technique for directing the learning activities of the individual pupil the present book is built.

¹¹See Chapter XIII for a more complete treatment.

I

SETTING UP LEARNING PRODUCTS

Learning is a transformation of processes. All learning is a change, a growth, a transformation of processes that results in a new way of behaving. Every situation in life calls for a reaction on the part of the individual. The individual's reaction, however, is connected not with the situation but with his perception of the situation. That is, if one's perception of the situation is attractive, one kind of behavior is called forth; if one's perception of the same situation is repulsive, another kind of behavior results. For example, if a child is confronted with a lighted candle, he will grasp for it because it looks attractive to him. It holds a certain meaning for him. Later as his fingers come closer to the flame there is a change of perception. The candle is now perceived as unattractive and the child shrinks back. The new way of behaving is not connected with the situation, a lighted candle, for it is the same as before. But the new way of behaving is connected with the change in the child's perception of the situation. There has been a transformation of meaning for him. In other words, he has learned. He has acquired a new way of behaving.

Since learning is a transformation of processes that results in a new way of behaving, the child, to learn, must acquire this new way of behaving. For example, when a child learns to write, there must occur a transformation of processes, he must acquire a new way of behaving. When he learns to spell, he acquires a new way of behaving. Likewise in reading, in skating, in adding, or in any learning in which he may engage.

The new way of behaving is a learning product. The new way of behaving may be a transformation (a) in the pupil's ability to do, (b) in his understanding of things, or (c) in his personal acceptance of worth and value. Whatever the nature of the transformation, however, it should be evidenced in a new way of behaving. The new way of behaving, since it occurs in the one who has engaged in the learning process, is properly called a learning product.

The learning product contributes to personality. A learning product is not an accumulation of facts gleaned from a textbook but is a new and worth-while way of behaving that contributes directly to the total of the pupil's personality. It is produced by the pupil perceiving, thinking, reading, performing acts of skill, or giving expression to a creative inner urge. The learning product, or new way of behaving, should always be evidenced in a new ability to do, in an intelligent attitude of understanding, or in a personal acceptance of worth and value that contributes to the development of the pupil's personality.

Illustration of learning products. Kilpatrick¹ gives an illustration of what we have in mind. Suppose a baby undertakes to feed himself with a spoon. On the way to his mouth the spoon turns over and the food is spilled. A difficulty has thus arisen which must be overcome in order for the activity of eating to continue. The baby tries again and again. Through trial and error, through guidance by his mother, through observation of others, he finally succeeds in feeding himself without overturning the spoon or spilling the food. He has learned! Through self-activity a worth-while change has been produced. Hitherto he could not feed himself; now he can. It is this change, this new way

¹William H. Kilpatrick, "Statement of Position"; *Twenty-sixth Yearbook of the National Society for the Study of Education*, Part II (The Foundation of Curriculum Making), p. 127. Bloomington, Illinois: Public School Publishing Company, 1927. (Data used with permission of the editors.)

of behaving, this transformation of processes permitting a balked activity to go forward that we call a learning product.

Let us apply this same principle further. Before a pupil has studied history, his reaction toward the problem of immigration is very likely to be an unintelligent attitude. For example, he may say that we have now too many immigrants in this country; or that this is the land of opportunity and all should come who may desire. As he studies history, however, that is, actually engages in learning activities that bring about a transformation of the meaning of immigration, a change takes place in his attitude. We describe the change by saying the pupil has acquired a transformation of meaning, a new way of behaving, so that when asked regarding immigration his response is based upon an intelligent understanding. It is this change, this transformation of meanings, this new way of behaving that we call a learning product.

Types of learning products. The new way of behaving may manifest itself as a learning product in one of three ways: (a) ability to do or the tendency to respond in the same manner whenever a familiar situation presents itself; (b) understanding or the tendency to transform the meaning of a situation; and (c) the personal acceptance of worth and value or the tendency to perceive the worth-whileness of a situation. These three types of learning products are described at greater length in the pages immediately following.

a. Ability to do. Learning products involving the ability to do include all those ways of behaving that are automatic or habitual in nature. They evidence themselves in specific habits, abilities, and acts of skill. They are definite ways of behaving, such as responding to specific requests to do things, memorizing poetry, reading a foreign language, responding to number combinations, or responding to situations such as reading, spelling, writing, dancing, typewriting, or playing the piano.

Some learning products of the ability to do type are very simple; that is, they involve a simple response, automatic in its nature, such as giving the product of 2×3 , the spelling of a short word such as "boy," or reading a line of easy prose. Other learning products of the ability to do type are more complex; that is, they involve a series of responses automatic in their nature, such as finding the product of 748×96 , doing certain gymnastic exercises that require coördination of many muscles, or moving the point of the pencil to form the letters and words as one expresses his ideas in writing.

The distinguishing characteristic of the learning product of the ability to do type is the movement-melody in the response. In developing an ability, all the contributory abilities, movements, and processes are *transformed* into a larger, unified ability, all parts of which harmonize with one another as do musical tones that form a melody. Such a transformation is plainly evidenced in the skillful play of the pianist's fingers, in the graceful whirl of the ballet dancer, in the rhythmic movements of the trained athlete.

The improvement in an ability consists of the construction of better and more complete forms of that ability. For example, in acquiring the ability to write, superfluous movements must be gradually eliminated, processes transformed, and better and more complete forms of the ability constructed, until the ability to write is acquired. Another illustration may be seen in the solving of an arithmetic problem involving multiplication, such as 748×96 . Here an untrained person will find it necessary to stop for the purpose of deciding what the product of 6×8 is, will hesitate before writing the correct figure in its proper position, or will use superfluous habits, such as counting on his fingers. These procedures slow up the mental processes and are handicaps in attainment of the desired learning product "to multiply

accurately and quickly.” However, as one engages in learning activities focussed upon this learning product a *change* takes place. Where, before, one hesitated, now one *automatically* associates the correct results with the figures as soon as they are recognized. For example, in multiplying the numbers 748×96 , the product 48 *automatically* comes into one’s mind for 6×8 . The figure 8 is then written and the 4 is remembered to be carried. The product 24 is given for 6×4 ; 4 is added to it making 28. The 8 is then written in the proper position, the 2 being remembered to be carried. This procedure is followed until the multiplication is complete and the correct answer is obtained. Between the first hesitating procedures and the later automatic responses a decided *change* has taken place. The pupil has learned; he now can multiply! It is this *change*, this new way of behaving, this transformation of processes uniting all the separate abilities and movements into a unified whole, that we call a learning product of the ability to do type. Examples of learning products of the type called “ability to do” are shown on pages 18-19.

b. Understanding. Through a succession of learning activities, learning material must be used by the pupil in devising for himself new and self-directed ways of behaving. Many of the learning activities will be adventures into the unknown—the meeting and solving of situations of difficulty—in order that balked activities, and life itself, may go forward. Out of such activities should arise an understanding, a wider outlook, a deeper insight, a clearer discernment of life and its relationships. For an individual to see the continuity of events, to discriminate between details, to discern the binding ties of causal relationship is, for that individual, the essence of understanding.

A learning product of the type called “understanding”

differs from the type called "ability to do" in being, not a fixed and automatic, response, but a method of thinking that leads to generalization. Such a learning product implies, not mere memorization, but the development of an intelligent attitude based upon a *transformation of meaning*. The pupil is now able to associate new ideas with other knowledge and to be conscious of their relationship. He now is able to *explain* his ideas and to express them, not in the language of the book, but in his own language.

For example, Colvin² tells of a group of pupils in algebra who for several days handed in examples correctly solved, but who later were unable to do examples of the same type given by the teacher. When the reason was sought it was found that the pupils had simply followed the solution of the model examples given in the textbook and did not *understand* the processes involved in their solution. When the model was not before them the pupils had no idea of the correct procedure. To solve problems by following the model examples required certain habits and skills it is true; but actually to *understand* the correct processes involved a transformation of meanings which the pupils had not experienced. Before this change took place they merely followed the model. After this change occurred they knew how to solve the problems because they understood. It is this transformation of meanings, this new way of behaving, this intelligent attitude toward things, that we call a learning product of the understanding type. Examples of learning products of the type called "understanding" are shown on pages 19-20.

c. Personal acceptance of worth and value. In his essay *Our Friend the Dog*, Maeterlinck considers the number of

²S. S. Colvin, *Introduction to High School Teaching*, p. 187. New York: The Macmillan Company, 1925. (Data used with permission of the publisher.)

decisions and generalizations that a dog must make in the first few weeks of life. His activities include "studying the ground, which can be scratched and dug up and which sometimes reveals surprising things, casting at the sky, which is uninteresting for there is nothing there to eat, one glance that does away with it for good and all."³ Man, too, spends his time studying the ground and digging it up and glancing at the sky. But man has not been content, as has the dog, with just one upward glance. In his struggle for existence man has not only glanced upward but has continued to glance upward. Ever has he sought the good, the beautiful, the true and has found them in nature and within himself. In his quest for happiness he has passed them on to posterity through music, through religion, through literature, science, and art. Teaching is concerned with the fact that within each of these there is the good, the beautiful, the true, the inherent worth of which the pupil should personally accept into his life. A pupil who has never studied music or the pupil upon whom the study of music has been forced may be bored or extremely irritated when listening to a highly technical selection. Later in the learning process, as the creative impulse is encouraged, as there is a liberation of music from within, as musical feelings and knowledge are developed, as creative tendencies appear and are made permanent through various forms of self-expression, real music takes on a new meaning. The pupil is a *changed* person. There is now an understanding kinship between himself and the world's greatest masters. He now recognizes the worth of a Beethoven, who, after spending hours alone with nature, was able to hear and remember the motifs which have comforted and inspired thousands. And,

³Maurice Maeterlinck, *Our Friend the Dog*, p. 6. New York: Dodd, Mead and Company, 1904. (Quoted with permission of the author.)

recognizing the inherent worth and value of such creative work, the pupil accepts it and makes it a part of himself. It is this transformation of meaning, this new way of behaving, this personal acceptance of worth and value, that we call a learning product of the type known as "personal acceptance of worth and value."

Of the three general types of learning products, "personal acceptance of worth and value" is the most important, the most vital. It is the one learning product that should be emphasized above all others. Examples of learning products of the type called "personal acceptance of worth and value" are shown on page 20.

Learning products in terms of pupil activity. Because learning is an active process on the part of the pupil and because it results in a permanent change in the pupil's way of behaving, the learning product should be set up in terms of pupil activity. Teachers frequently state their objectives in terms of teacher activities in which expressions such as the following are used:

The aim of this lesson is to show that.....

The aim of this lesson is to emphasize.....

The aim of this lesson is to give.....

The aim of this lesson is to present.....

The aim of this lesson is to bring out.....

The aim of this lesson is to impress.....

All such statements are in terms of teacher activities and reflect a false concept of the learning process. This is because the true learning product is always developed through the pupil's self-activity; hence the product of the learning should be stated in *pupil-activity* terms.

(1) If the learning product is an ability to do, the particular habit, ability, or skill to be acquired should be set up in pupil-activity terms of ability to do. For example, to

skate; to use capital letters and punctuation marks correctly; to spell correctly words of the type of "receive"; or to write shorthand accurately at the rate of one hundred twenty words a minute. (See page 18 for other examples.)

(2) If the learning product is the attainment of understanding, the particular idea or principle to be understood should be set up. For example, to understand how sleep habits are related to health; to understand the relation of climate to products of South America; to understand the basic principles of corporations and stocks; or to understand the composition and properties of air. (See page 19 for other examples.)

(3) If the learning product is the personal acceptance of the worth and value of a thing, the specific value that is to be recognized and accepted must be pointed out. For example, to recognize and accept the æsthetic value of our wild flowers; to recognize and respond to the value of street signs; to recognize and accept what constitutes a good breakfast for a fifth-grade pupil; or to recognize and accept as being worth while the beauty of phrasing. (See page 20 for other examples.)

Setting up learning products. Too long has instruction been organized in terms of subjects of study such as spelling, history, geography, or arithmetic. Such an organization does not give the proper articulation with life. A newer and much better procedure is for the teacher to break down the subject walls and in their stead set up large units of work out of which come ways of behaving that evidence integration of the child's personality. These learning products should not be thought of in terms of amount of work to be done or amount of time required, but should be (a) changes in the pupil's ability to do things, (b) changes in his understanding of things, and (c) changes in his personal acceptance of the worth and

value of things. Each learning product should be separated into the *contributory* abilities, understandings, or acceptances that compose it. For example, the learning product called "to be able to do long division" involves *contributory* abilities such as doing short division, multiplying, subtracting, borrowing, and carrying. These *contributory* abilities must be determined, acquired through pupil activity, and transformed by the pupil into the new way of behaving called the ability to do long division. In like manner, the learning product called "to understand the immigration problem" involves *contributory* understandings such as what peoples come to this country, why they come, and the policy of the United States toward immigration. These *contributory* understandings must be determined, acquired through pupil activity, and transformed by the pupil into the new way of behaving called an understanding of immigration. Likewise, the learning product called "personally to accept the worth and value of good poetry" involves *contributory* recognitions of the emotional tone, the imaginative quality of the thought, and the rhythmic form. These *contributory* recognitions must be determined, acquired through pupil activity, and transformed by the pupil into the new way of behaving evidenced in a personal acceptance of the worth and value of good poetry.

The three learning products here mentioned, with their *contributory* abilities, understandings, and recognitions, as well as other learning products, are further illustrated below:

I. Ability to do

A. *Subject:* Arithmetic

Class level: Grade V

Learning product: To be able to do long division

Contributory abilities:

1. Striking off zeros
2. Doing short division
3. Using the new form of operation
4. Multiplying
5. Carrying
6. Subtracting
7. Borrowing
8. Estimating the quotient
9. Using a two-figure divisor
10. Using a three-figure quotient
11. Using a three-figure divisor
12. Using zeros in the quotient

B. *Subject:* Arithmetic

Class level: Grade V

Learning product: To be able to add fractions

Contributory abilities:

1. Addition of integers
2. Multiplication of integers
3. Division of integers

II. Understanding

A. *Subject:* United States history

Class level: Grade VIII

Learning product: To understand the problem of immigration

Contributory understandings:

1. The cause of immigration
2. The type of immigrants
3. Procedure in order to come to United States
4. Extent of immigration
5. Policy of United States toward immigration
6. Results of unrestricted immigration
7. Assimilation of the immigrant

B. *Subject:* Forestry

Class level: Junior high school

Learning product: To understand what my state is doing to preserve, increase, and use legitimately the forests and their products

Contributory understandings:

1. The common enemies of trees
2. How the common enemies are combated
3. The relation of trees to health, water supply, food supply, and industrial needs
4. Proper lumbering methods
5. Organizations that are working for forest conservation

C. Subject: Foods

Class level: Junior high school

Learning product: To understand the value of correct selection and use of food relative to health habits

Contributory understandings:

1. Why we need food
2. Sources of food
3. Nutrients supplied by different foods
4. Sanitary handling of foods in markets, in storage, and by vendors

D. Subject: General science

Class level: Junior high school

Learning product: To understand how the movements of the earth affect our life

Contributory understandings:

1. Cause of day and night
2. Cause of seasons
3. Cause of tides
4. How direction is determined
5. How location is determined
6. Use of time
7. Relative positions of earth at dawn, noon, midnight, winter, summer

III. Personal acceptance of worth and value**A. Subject:** Art

Class level: Grade VI

Learning product: To accept personally the worth and value of the picture "The Gleaners"

Contributory recognitions:

1. A recognition that cheerfulness and industry are often found in the midst of poverty and monotony

2. A recognition that an artist can portray these characteristics and conditions

B. Subject: Poetry

Class level: High school

Learning product: To accept personally the worth and value of good poetry

Contributory acceptances:

1. The emotional tone
2. The imaginative quality of the thought
3. The rhythmic form

Summary. A learning product is a permanent and worthwhile change in a pupil—a new way of behaving that contributes to the total of the pupil's personality. The learning products consist, in general, of ability to do, understanding, and the personal acceptance of worth and value. This becomes, then, the first practice in the Learning-Product Technique: to set up learning products in terms of new ways of behaving to be attained by the pupil.

SUGGESTIONS AND STUDY HELPS

1. Set up learning products for some particular subject you expect to teach.
2. Do the learning products include the three types mentioned in the present chapter?
3. Make a study of the pupils in some particular class to determine their individual needs. Should the learning products be differentiated to meet these needs?
4. How can the learning products be made known to the pupils? List the different methods you have tried and describe the method you found best.
5. How can the learning products be stated so pupils of grade I will understand them?
6. Could you teach to produce learning products of ability to do, an attitude of understanding, and the personal acceptance of worth and value all at the same time? Illustrate.
7. How can you tell when the pupil has attained the learning products?

8. Try out in actual classroom teaching the foregoing suggestions and tell why you found them to be practical.

HELPFUL REFERENCES

- COLVIN, S. S., *Introduction to High School Teaching*, Ch. XVI. New York: The Macmillan Company, 1925
- DOUGLASS, H. R., *Modern Methods in High School Teaching*, Ch. I. Boston: Houghton Mifflin Company, 1926
- HOLLEY, C. E., *The Teacher's Technique*, Ch. IV. New York: The Century Company, 1923
- KILPATRICK, W. H., "Statement of Position"; *Twenty-sixth Yearbook of the National Society for the Study of Education*, Part II, p. 119. Bloomington, Ill.: Public School Publishing Company, 1927
- KOFFKA, KURT, *The Growth of the Mind*. New York: Harcourt, Brace and Company, 1924
- MONROE, W. S., *Directing Learning in the High School*, Ch. III. New York: Doubleday, Page and Company, 1927
- THOMAS, F. W., *Principles and Technique of Teaching*, Ch. III. Boston: Houghton Mifflin Company, 1927

II

PROVIDING THE LEARNING ACTIVITIES

The learning activity. As stated in Chapter I, the first practice in the Learning-Product Technique is to set up learning products in terms of new ways of behaving to be attained by the pupil. Since learning is a self-active process on the part of the pupil, it follows that the second practice is to provide the learning activities that will develop the desired learning product.

A learning activity is any learning experience produced through self-actuated doing. Through it the pupil attains a desired learning product. The learning activity may be a mental one, a physical one, or an emotionalized one. But whatever form of expression it assumes, the learning activity must result in a transformation of processes, a way of behaving, a form of self-expression that contributes directly to the integrating of the pupil's personality and the attainment of the desired learning product.

The learning activity must always be focussed directly upon the learning product. The learning product is the goal, the learning activity is that which enables the pupil to reach the goal. Therefore, in order for the pupil to reach the goal, his learning activities must be focussed upon the desired learning product. The learning activities that result in the production of the three types of learning products¹ necessarily differ in their nature depending upon the type of learning product to be attained. For this reason it is necessary that the teacher set up large units of work and know what the learning products are to be and what learning activities will produce them. The learning activities that

¹See Chapter I.

will call forth each learning product should be carefully considered by the teacher.

The various kinds of learning activities necessary to produce the learning products are described in fuller detail in the pages immediately following.

a. **Learning activities that produce ability to do.** The learning product called ability to do is not a mere summation of separate, contributory abilities but is the *transformation* of all the contributory abilities into a unified, larger ability. For example, the ability to write is not a mere summation of the separate movements and contributory abilities necessary for writing; it is the transformation of these movements and abilities into a harmonious, unified whole; it is acquired through constructing better and more complete forms of the ability *to write*. In the development, therefore, of a learning product belonging to the ability to do type the teacher should provide learning activities that call for continuation of the learning process until the contributory abilities are transformed into the larger, unified ability.

Thorndike says:

The likelihood that any mental state or act will occur in response to any situation is in proportion to the frequency, recency, intensity, and resulting satisfaction of its connection with that situation or some part of it and with the total frame of mind in which the situation is felt.²

Bagley says:

[In habit formation there is required] focalization of consciousness upon the process to be automatized, plus attentive repetition of this process, permitting no exceptions until automatism results.³

²E. L. Thorndike, *The Elements of Psychology*, p. 207. New York: A. G. Seiler, 1907. (Quoted with permission of the publisher.)

³W. C. Bagley, *Classroom Management*, p. 16. New York: The Macmillan Company, 1907. (Quoted with permission of the publisher.)

Monroe says:

[There should be] initial phases: a correct start and attention focussed upon the response to be habituated. Practice or drill: repetitions of the response which are attentive, correct, satisfying to the learner, and sufficient in number to make the habit automatic.⁴

These descriptions of the procedure to be followed in developing the learning product called ability to do suggest that the learning activities consist of (1) a correct start in the ability and (2) intelligent continuation to the point of automatism.

1. *A correct start.* It is important that the teacher keep in mind the necessity of getting the pupil started correctly. A correct start does not mean that the pupil responds perfectly. It means rather that he understands what he is to do and how he is to do it.

Parker says:

It is important to make a correct start. Thus, in learning to toss balls it is desirable to introduce as early as possible the right-to-left circular motion, and in learning a foreign language it is important to establish as directly as possible the connection between the foreign symbols and their meanings.⁵

Examples of learning activities involving a correct start are shown on pages 39-40.

2. *Continuation of the learning activity.* After the pupil has made a correct start, it becomes necessary that he continue the learning activity to the point of automatism. However good the start may be the pupil will not attain the learning product until the ability becomes automatic and evidences itself in his personality as a new way of behaving. This

⁴W. S. Monroe, *Directing Learning in the High School*, p. 126. New York: Doubleday, Page and Company, 1927. (Quoted with permission of the publisher.)

⁵S. C. Parker, *Methods of Teaching in High Schools*, p. 109. Boston: Ginn and Company, 1920. (Quoted with permission of the publisher.)

requires repetition of the activity over and over again until automatism is attained. It is an old, old maxim that practice makes perfect. All such practice, however, should be intelligent practice; that is, the pupil should know what he is to achieve and how he is to do it, should recognize when he is going right or wrong, and should know his progress toward attainment of the learning product. Furthermore, attention is necessary so the pupil will know the object of the drill and the elements that enter into the practice. An excellent illustration of the importance and value of the pupil giving attention to the learning activity is shown in the card-sorting experiment reported by Pyle.

In the card-sorting experiments, the fast learners gave themselves over completely to the work. For the time being the world was to them a card-sorting world; nothing else existed; nothing else was for the time of any consequence. The card-sorting completely occupied the central neural activities. Their bodies were rigid and tense, they leaned forward to their tasks, they whispered to themselves the numbers of the cards.

With the slow or poor learners, all was different. Their bodies were relaxed, and many other activities shared the central field of neural activity with the card-sorting performance. They often gazed about the room, listened to the various noises, and watched their associates in the laboratory.

When the fast learner found a box, he deposited the card and *dwelt upon the location of the box . . .*

When the poor learner finds a box the card is dropped into it and before there is time for the idea of location to develop and helpful associative ideas to form, the subject passes on to the next card, and the whole experience with the card just deposited becomes almost as if it had not been. And when he, a little later, comes to a card of the same number, he must hunt for the box again.⁶

Examples of learning activities involving continuation of the ability are shown on pages 39-40.

⁶W. H. Pyle, *The Psychology of Learning*, p. 55. Baltimore: Warwick and York, 1921. (Quoted with permission of the publisher.)

b. Learning activities that produce understanding. The learning product called understanding is always characterized by the *transformation of meaning*. In the development, therefore, of a learning product belonging to the type called understanding the teacher should provide learning activities that call for the transformation of meaning through:

1. Perceptual experiences
2. The use of reading
3. Problem solving or thinking
4. Creative self-expression

1. *Learning activities consisting of perceptual experiences.* The learning activities of the pupil in attaining understanding should include perceptual experiences. That this is a normal way of developing understanding is stressed by Bobbitt, who says:

From early infancy onward, without thought . . . of learning, man normally observes the world round about him. As he moves along the streets, drives through the country, sits at a car window, visits a factory, coöperates with his fellows, and wherever else, he is ever watchful, automatically watchful without effort or intention, of persons, actions, manners and customs, the things and phenomena of nature, the work of man's hands, and whatever else makes up his surroundings. Child or man, savage or civilized, this continuous observation is one of man's normal reactions to the presence of environment.⁷

All such perceptual experiences should include five things:
(a) A visual imagery of both concrete things and processes. For example, seeing the apparatus and observing the demonstrations in the laboratory; looking at pictures, drawings, maps, and diagrams; or observing the trees, shrubs, birds, and flowers while on a field trip.

⁷Franklin Bobbitt, *How to Make a Curriculum*, p. 45. Boston: Houghton Mifflin Company, 1924. (Quoted with permission of, and by arrangement with, Houghton Mifflin Company, the authorized publishers.)

(b) Listening to the oral reports of the experiences and observations of others. For example, listening to the explanations of the solution of problems, hearing music, or experiencing second hand the things described by an interesting and vivid story-teller.

(c) Feeling, involving touching, handling, and manipulating. For example, the manipulation of apparatus during a laboratory experiment; the handling of specimens in the school museum, and during a field trip; or feeling the smoothness of the cloth while making a dress.

(d) Smelling. For example, smelling the odors peculiar to certain chemicals in the laboratory; smelling the odors while cooking an article of food; or detecting undesirable odors arising from decay, fermentation, or lack of sanitation.

(e) Tasting. For example, in cooking classes, tasting the dessert to determine its flavor; or tasting the finished product to determine the palatable success of one's labors.

All such perceptual activities transform the meaning of the object and facilitate economical learning. Monroe says:

The function of perceptual experiencing is to provide the "images and halos" that constitute the basic elements of knowledge. It is frequently said that one acquires an idea of a hammer by using it; an idea of football by playing or observing the game; an idea of an apple by feeling, seeing, smelling, and eating it. Such statements are only a way of saying that perceptual experiencing furnishes the material for the meanings associated with objects and events, and in turn with language symbols. Without a usable foundation of perceptual experiences one could not acquire knowledge, that is, he would not have any meaning to associate with objects and events, or with language symbols.⁸

Examples of learning activities consisting of perceptual experiencing are shown on pages 41-46.

⁸W. S. Monroe, *Directing Learning in the High School*, p. 162. New York: Doubleday, Page and Company, 1927. (Quoted with permission of the publisher.)

2. *Learning activities consisting of reading.* Bobbitt says that reading

has advantage over direct observation. It transcends the limitations of time and space and sense. It lifts the curtain upon the whole nation and all of its activities, the whole world and all its strivings, and even the universe beyond as far as man has been able to penetrate. It opens up the past to one's vision. It can make the long past live before one's eyes as clearly as the past of an hour ago. It enables one to see the hidden, the minute, the intangible, the invisible, the general.⁹

Such reading activities should involve two kinds:

- (a) Reading for *work* purposes
- (b) Reading for *recreational* purposes

(a) *Reading for work purposes.* The typical situations which cause people to do reading of the *work* type have been outlined by the National Committee on Reading, as follows:

1. To cross streets, to find stores and houses, and to make longer journeys: reading signs, railroad folders, maps, road guides.
2. To understand assignments and directions in both school and life activities.
3. To work out complicated problems or experiments: reading Scout Manuals, materials on radio, cookbooks, problems in arithmetic, and science manuals. Adults have also to read income blanks and materials relating to their vocations, home-making, care of children.
4. To find or verify spelling, pronunciation, meaning, use of words: using the dictionary, encyclopedia, and other reference books.
5. To gather materials for fuller understanding or for talking or writing on one's hobby, for assigned papers and discussions in school or club, and for experiments: a common type of work in schools which have gone beyond the one-text stage, using all the facilities

⁹Franklin Bobbitt, *How to Make a Curriculum*, p. 55. Boston: Houghton Mifflin Company, 1924. (Quoted with permission of, and by arrangement with, Houghton Mifflin Company, the authorized publishers.)

of the reference library, and tables of contents, indexes, headings, charts, illustrations, graphs, and tables in books.

6. To inform or convince others: reading aloud minutes, notices, instructions, announcements, resolutions, reports (including compositions on work type topics)—usually when only one person has the matter before him—and reading aloud passages bearing on points under discussion.

7. To know what is going on: reading news items, comments on events, book and drama reviews; looking over publishers' lists; tracing quotations or allusions or tracing and verifying statements to keep one up to the times. (For many people this sort of reading is recreational; for others it is distinctly work.) In school, this is represented by many assignments in civics, American problems, international relations, and current history, and in the reading of bulletins in rooms or halls and communications from other classes and schools. A common illustration among adults is reading or skimming trade, manufacturing, and professional journals, and books or reports, to see what is new and how others in one's field are acting and thinking.

8. To decide how to act in new situations: reading notices, warnings, "advice to young people," business offers, advertisements. Pupils realize that they must meet new situations increasingly as they grow up. Such reading is done in school and needs to be done oftener on assignments in which pupils learn to weigh the accuracy and reliability of statements and make a choice, or secure full information and then decide what to continue and complete.

9. To reach conclusions as to guiding principles, relative values, or cause and effect: reading conflicting opinions as to school athletics, social behavior, politics, war, and the like; reading reports and editorials about strikes, elections, committee hearings. Here, again, good schools, by assignments like those listed in No. 7 above, are doing valuable work. This also leads to devising new problems or determining action. Such independent reading is what all self-directed and intelligent workers do in real life; we need much more of it in school.¹⁰

(b) *Reading for recreational purposes.* In addition to the

¹⁰Report of the National Committee on Reading, p. 5; *Twenty-fourth Yearbook of the National Society for the Study of Education*, Part I. Bloomington, Illinois: Public School Publishing Company, 1925. (Quoted with permission of the editor.)

types of reading just mentioned under the name "work" reading, the pupil should be encouraged to read books and articles covering a wide range of subjects not closely related to his daily school work. Such reading includes the recognized masterpieces of literature as well as many selections and books not so recognized, but which portray life as it is now, and also as it has been, through the ages. Such reading is directly connected with the pupil's daily school life, influences his thinking and behavior and enables him to live more fully and to enjoy life more deeply.

According to the report of the National Committee on Reading the typical situations which lead people to do reading of the recreational type are as follows:

1. To relive common everyday experiences: enjoying stories of home and school and of one's own village or city, such as *Little Women* and *Tom Sawyer* for children, and Garland's stories and Whittier's verse for adults.

2. For fun or sheer enjoyment during leisure time: reading jokes, nonsense rhymes, Briggs' boy-cartoons for children, and familiar essays like Leacock's, Cobb's, more rarely Lamb's or Irving's, for adults. More reading for this purpose is needed in schools.

3. To enjoy "sudden changes and sharp contrasts"—positive excitement: reading stories of adventure and accounts of travel and peril, like *Robinson Crusoe*, the *Arabian Nights*, *Treasure Island*, du Chaillu's hunting adventures, accounts of the Japanese disaster.

4. To get away from real life: reading romances and pictures of impossible idealism such as Tennyson's *Sir Galahad* or Longfellow's *Excelsior*.

5. To enjoy ready-made emotional reactions (via the "emotional short circuit"): reading cheap sentimental verses and lurid and soft romances like the Elsie Dinsmore series and Barbour's cheapest tales, and stories of stupidly romantic love. Common as this reading is, it, of course, has no rightful place in school.

6. To satisfy natural and valuable curiosities about human nature and motives: reading excellent character portrayals in fiction plays, and verse such as Irving's, Shakespeare's, and Dickens'.

7. To give pleasure to others: reading aloud, as among friends after supper, most frequently from materials like those mentioned in 1, 3, and 6 on preceding page.

8. To read aloud parts of plays and dramatic dialogues for enjoyment in class or preparation for further dramatization.

9. To satisfy curiosity about animals, strange regions and times, and current happenings away from one's own environment: reading encyclopedias, travel and nature books and magazines, histories, and miscellaneous portrayals of new experiences. Here the shift to purposive reading occurs and very satisfactorily.

10. To enjoy sensory imagery: the pictures and odors, the feel and sound—less frequently music and movement of poetry and poetic prose, sometimes by reading it aloud to one's self or by genuinely sharing pleasant experiences in discussing them with sympathetic friends. This is, of course, most often combined with purposes like those above. As a separate pursuit, it is to be distrusted. Enjoyment of this sort is rarely, if ever, furthered by analytical study.¹¹

3. *Learning activities of thinking or problem solving.* In order to produce the learning product called understanding, some of the learning activities of the pupil should consist of problem solving. A problem is a difficulty, a perplexing situation about which something must be done. When things are clear, they are taken for granted. When things are not clear, or when a decision must be reached, a problem has been discovered. The solution of a problem requires a method of thinking that leads to generalization. A complete act of thought consists, according to Dewey, of five steps:

(a) A felt difficulty. For example, Dewey gives the following instance:

Projecting nearly horizontally from the upper deck of the ferryboat on which I daily cross the river, is a long white pole, bearing a gilded ball at its tip. It suggested a flagpole when I first saw it; its color, shape, and gilded ball agreed with this idea, and these reasons seemed to justify me in this belief. But soon difficulties presented themselves.¹²

¹¹*Ibid.*, p. 7. (Quoted with permission of the editor.)

¹²John Dewey, *How We Think*, p. 72. Boston: D. C. Heath and Company, 1910. (Used with permission of the publisher.)

(b) Its location and definition. For example, Dewey, continuing, says:

The pole was nearly horizontal, an unusual position for a flagpole; in the next place, there was no pulley, ring, or cord by which to attach a flag; finally there were elsewhere two vertical staffs from which flags were occasionally flown. It seemed probable that the pole was not there for flagflying.

(c) Suggestion of possible solution. For example, Dewey says:

I then tried to imagine all possible purposes of such a pole, and to consider for which of these it was best suited: (a) Possibly it was an ornament. But as all the ferryboats and even the tugboats carried like poles, this hypothesis was rejected. (b) Possibly it was the terminal of a wireless telegraph. But the same considerations made this improbable. Besides, the more natural place for such a terminal would be the highest part of the boat, on top of the pilot house. (c) Its purpose might be to point out the direction in which the boat is moving.

(d) Development by reasoning of the bearings of the suggestion. For example, Dewey reasoned:

In support of this conclusion, I discovered that the pole was lower than the pilot house, so that the steersman could easily see it. Moreover, the tip was enough higher than the base, so that, from the pilot's position, it must appear to project far out in front of the boat. Moreover, the pilot being near the front of the boat, he would need some such guide as to its direction. Tugboats would also need poles for such a purpose.

(e) Further observation and experiment leading to its acceptance or rejection; that is, the conclusion of belief or disbelief. For example, Dewey, in conclusion says:

This hypothesis was so much more probable than the others that I accepted it. I formed the conclusion that the pole was set up for the purpose of showing the pilot the direction in which the boat pointed, to enable him to steer correctly.

Examples of learning activities that involve problem solving are shown on pages 41-46.

4. *Learning activities involving creative self-expression.* The development of personality demands freedom of expression and opportunity for the exercise of originality. Therefore, one of the important learning activities in the development of understanding is the activity that involves creative self-expression.

Every normal child has the natural desire to make things. It is in the nature of the child to create, and nothing brings him so much joy—the joy of creative self-expression. In activities calling for creative self-expression it is not imitation that is sought, nor invention, but the spontaneous expression in the child's own way of an inner urge that may be further awakened and developed. The pupil is not creating anything as the term is commonly used. He is simply discovering and outlining in thought or deed a part of his own individuality.

When engaged in a learning activity involving creative self-expression the pupil draws, models, composes music or poetry, organizes his ideas, gives reports, puts on lantern talks, or expresses himself in rhythms and dramatics. For one thus to objectify, to incarnate, one's thought or one's life-experience in a visible or audible form is one of the most impelling urges of the human mind.

Creative self-expression activities are concerned chiefly with the development of the pupil's personality. They make use of the constructive tendencies of the pupil to enhance his interest, to enrich his understanding, to increase his ability to do. They lead to free and original self-expression both of hand and mind, offering to each pupil—whether talented or not—an opportunity to share in a creative self-expression that leads to habits of creative work.

The value of the creative self-expression learning activity does not lie in the material result but in the process itself. Its vital function is not in the worth of the thing created, whatever form it may be in, but in the revelation of the pupil's individuality and the opportunity for discovery and development of his individual self-hood.

Examples of learning activities that require creative self-expression are shown on pages 41-46.

c. Learning activities that produce personal acceptance of worth and value. It is true that personal acceptance of worth and value is oftentimes produced as a by-product and not as a direct learning product. It is also true, however, that the personal acceptance of worth and value denotes a change, a new way of behaving, an integration of the pupil's personality and therefore is a true learning product. Personal acceptance of worth and value, therefore, should be set up as a direct learning product the same as any other learning product. Of the three general types of learning products, personal acceptance of worth and value is the most important, the most vital. It is the one learning product that should be emphasized above all others.

The learning product known as a personal acceptance of worth and value is characterized by (1) an emotional participation by the learner in the thing that is to be accepted and (2) an expression by the learner that the worth and value of the thing have been personally accepted.

In striving to develop a personal acceptance of worth and value, the teacher should select definite learning activities that require three things:

1. *The ability to do.* This does not mean that the pupil must perform acts of skill. It does mean, however, that if the pupil has ability to do, that is, to typewrite, to sing, to draw, to create poetry, the likelihood that he will recognize

and accept the worth and value of these things is greatly increased. The learning activities involving ability to do are described in detail on pages 24-26 of this chapter.

2. *The understanding that comes through an intelligent attitude.* An intelligent attitude of understanding is produced through (a) perceiving a thing in its manifold relationships, (b) extensive reading about the thing, (c) solving successfully a perplexing problem, or (d) developing a creative work that gives expression to a living, inner urge. These all increase one's power to recognize and accept the worth and value of the thing itself. The learning activities that involve understanding are described fully on pages 27-35 of this chapter.

3. *The perceiving of personal relationship.* The learning activity should call forth the perceiving of a close, personal relationship between the pupil and the thing that is to be accepted as being worth while. For example, if the pupil perceives a personal relationship between himself and having shoes well shined then the personal acceptance of the worth and value of having well-shined shoes will be more easily developed as a learning product; or if the pupil perceives a personal relationship between himself and neatness and accuracy in typewriting then a personal acceptance of the worth and value of neatness and accuracy in typewriting will be developed more easily as a learning product; or if the pupil perceives a personal relationship between himself and being courteous to those about him then the personal acceptance of the worth and value of courtesy will be developed more readily as a learning product.

The learning activities that will develop the perceiving of a personal relationship may be classified into three groups, as follows:

(a) Social-situation activities in which the pupil lives, or

relives, a situation by identifying himself with a cause or its champions. The pupil does this by living, or reliving, the situation under conditions identical, or similar, to the original conditions. A well-known form of the social-situation activity is seen in dramatization.

(b) Intellectual-situation activities in which the pupil participates imaginatively in a situation by identifying himself with an author or his characters. The intellectual-situation activity does not call for dramatization but for mental imagery. A good example of imaginative participation is seen in the study of *Snow-bound*. In order for the pupil to perceive a personal relationship between himself and the characters of the poem, he must be able from his background of experience and understanding to build up mental pictures and to see in his mind the scenes and characters described in the poem.

(c) Æsthetic-situation activities in which the pupil shares in the emotional tone of a situation by identifying himself with an artist or his creations. The æsthetic-situation activity calls for sympathetic sharing based on the emotional experiences of the pupil himself. For example, if the pupil is to perceive a personal relationship between himself and Bryant's emotional tone as recorded in his *Lines to a Waterfowl*, the pupil must recall lonely moments that he himself has experienced and thus project himself into the emotional tone of the poet. Only when he is able thus to share in the emotional tone of the poet can the pupil personally accept the real worth and value of the poem *Lines to a Waterfowl* and truly appreciate its hidden meanings.

To summarize, the learning product called personal acceptance of worth and value, while based on and growing out of learning activities involving ability to do and

understanding, is also dependent upon learning activities that are highly *emotionalized* through the personal relationship of the pupil both to the learning activity and to the learning product. The acceptance of worth and value is always a personal affair. Attempts to develop it as a learning product *en masse* will be successful only in so far as the personal relationship is established within each individual.

Examples of learning activities focussed upon the learning products. The learning activity must always be focussed directly upon the learning product. The learning product is the goal, the learning activity is that which enables the pupil to reach the goal. In order for the pupil to reach the goal, to acquire the new way of behaving, his learning activities must be focussed upon the desired learning product.

Examples of the technique of selecting learning activities and focussing them upon a learning product are presented in the pages immediately following. These examples are given not in minute detail but merely in guide form. The purpose is not to present perfect models but to direct the thinking of the teacher as she applies the Learning-Product Technique to her own subjects. The examples presented are not theoretical but represent successful usages of the Learning-Product Technique in actual classroom situations. In each instance, learning products were set up in terms of changes in the pupil's ability to do things, changes in his understanding of things, or changes in his personal acceptance of the worth and value of things. Learning activities that would produce the learning product were then provided, and the source material grouped around the activities. Later each learning activity was individualized to meet the needs of each pupil. Examples are presented in (1) ability to do, (2) understanding, and (3) personal acceptance of worth and value.

I. Ability to do

A. *Subject:* Arithmetic

Class level: Grade V

Learning product: To be able to do long division

Contributory abilities:

1. Striking off zeros
2. Doing short division
3. Using the new form of operation
4. Multiplying
5. Carrying
6. Subtracting
7. Borrowing
8. Estimating the quotient
9. Using a two-figure divisor
10. Using a three-figure quotient
11. Using a three-figure divisor
12. Using zeros in the quotient

Learning activities:

1. A correct start
 - (a) Exploratory test¹³ (based on contributory abilities)
 - (b) Presentation of learning product¹⁴ (involving demonstration and explanation by teacher)
 - (c) Pupil performance (problem solving involving long division)
2. Continuation of learning activity
 - (a) Activities involving use of division in situations similar to those that life offers
 - (b) Activities that provide drill at points of error
 - (c) Activities that are individualized for each pupil¹⁵
 - (d) Activities that involve knowledge of the pupil's progress¹⁶

Sources of help and information:

1. Teacher
2. Textbook problems
3. Supplementary problems
4. Class discussion

¹³See Chapter V for technique of exploratory test.

¹⁴See Chapter VI for technique of presentation of learning product.

¹⁵See Chapter V for technique of individualizing the learning activities.

¹⁶See Chapter XIII for technique of progress charts.

B. Subject: Arithmetic

Class level: Grade V

Learning product: To be able to add fractions

Contributory abilities:

1. Addition of integers
2. Multiplication of integers
3. Division of integers

Learning activities:

1. A correct start
 - (a) Exploratory test¹⁷ (based on contributory abilities)
 - (b) Presentation of learning product¹⁸ (involving demonstration and explanation by teacher)
 - (c) Pupil performance (problem solving involving addition of fractions)
 - (1) Division of integers into fractions
 - (2) Addition of similar fractions
 - (3) Addition of dissimilar fractions
 - (4) Reduction to mixed numbers
2. Continuation of learning activity
 - (a) Activities involving use of addition of fractions in situations similar to those that life offers
 - (b) Activities that involve drill on chief types of addition of fractions.
 - (1) Adding fractions with unlike denominators
 - (2) Reduction of fractions to common denominator
 - (3) Addition of numerators
 - (4) Reduction to mixed numbers
 - (c) Activities that provide drill at points of error
 - (d) Activities that are individualized to meet needs of each pupil¹⁹
 - (e) Activities that involve knowledge of progress²⁰

Sources of help and information:

1. Objects, such as apples, chalk, circles, squares
2. Textbook
3. Supplementary texts
4. Problems supplied by teacher and pupils

¹⁷See Chapter V for technique of exploratory test.

¹⁸See Chapter VI for technique of presentation of learning product.

¹⁹See Chapter V for technique of individualizing the learning activities.

²⁰See Chapter XIII for technique of progress charts.

II. Understanding

A. *Subject:* Forestry

Class level: Junior high school

Learning product: To understand what my state is doing to preserve, increase, and use legitimately the forests and their products

Contributory understandings:

1. The common enemies of trees
2. How the common enemies are combated
3. The relation of trees to health, water supply, food supply, and industrial needs
4. Proper lumbering methods
5. Organizations that are working for forest conservation

*Learning activities:*²¹

1. Perceptual experiences
 - (a) Seeing—pictures, films, slides, drawings, field trips, specimens
 - (b) Hearing—pupil reports, discussions, club work, teacher's presentation
2. Reading—text, reference readings
3. Problem solving or thinking
 - (a) Study of tree pests to determine life, history, habits, destructiveness
 - (b) Testing remedies and reporting results
 - (c) Determining causes of decay and death of trees
4. Creative self-expression
 - (a) Laying out a park plan with special reference to trees
 - (b) Constructing tree-planting scheme for home or school grounds
 - (c) Making farm diagram showing windbreaks of trees
 - (d) Securing and planting trees
 - (e) Planning a public forest camp
 - (f) Evolving a set of rules for use of forest as a place of recreation

Sources of help and information:

1. Films
 - (a) Forest Service, United States Department of Agriculture, Washington, D. C.

²¹These presuppose an exploratory test as described in Chapter V and a presentation of learning product as described in Chapter VI.

PROGRESSIVE PRACTICES

Series F. S. No. 7, Forestry in the United States

Series F. S. No. 10, Recreation on National Forests

Series F. S. No. 11, The Work of the Forest Service

Series F. S. No. 12, Relation of Forests to Irrigation

- (b) General Electric Company, Schenectady, N. Y.
No. 33, The Conquest of the Forest

2. Slides

Pennsylvania State Museum, Harrisburg, Pa.

Series F. G. and Series F. P.

3. Texts

Moseley, E. L., *Trees, Stars, and Birds*, Yonkers-on-Hudson:
World Book Company, 1919

4. Supplementary books

(a) Keeler, H. L., *Our Native Trees and How to Identify Them*, New York: Charles Scribner's Sons, 1900

(b) Rogers, Julia E., *The Tree Book*, Garden City, N. Y.:
Doubleday, Page and Company, 1905

(c) Stone, Gertrude L., and Fickett, M. G., *Trees in Prose and Poetry*, 1902

5. Bulletins

(a) Mellon National Bank, Pittsburgh, Pa. *America's Lumber Supply*

(b) Pennsylvania State Department of Forests and Waters,
Harrisburg, Pa.

(1) In Penn's Woods

(2) How to Use the State Forests

(c) United States Department of Agriculture, Washington,
D. C.

Bulletins 622, 886, 1177, 1208, 1482

B. Subject: Foods

Class level: Junior high school

Learning product: To understand the value of correct selection
and use of food relative to health habits

Contributory understandings:

1. Why we need food

2. Sources of food

3. Nutrients supplied by different foods

4. Sanitary handling of foods in markets, in storage, and by
vendors

*Learning activities:*²²

1. Perceptual experiences
 - (a) Seeing—actual foods, pictures, films, slides
 - (b) Hearing—pupil reports, class discussions, teacher presentation
 - (c) Smelling—smelling foods
 - (d) Tasting—tasting foods
2. Reading—texts, library and home reading
3. Problem solving
 - (a) Testing foods for nutrients
 - (b) Testing foods for presence of bacteria, mold, adulterants
4. Creative self-expression
Construction of diagrams, models, charts, showing results of testing foods, plant growth, transpiration, and other processes related to foods

Sources of help and information:

1. Films
 - (a) Bray Productions Incorporated, New York City
The Digestive System, Human Body Series
 - (b) General Electric Company, Schenectady, N. Y.
Our Daily Bread
2. Slides
Pennsylvania State College, State College, Pa.
Useful Plants
Home Canning
3. Bulletins
 - (a) United States Department of Agriculture, Washington, D. C.
Bulletins 602, 847, 876, 1064, 1214
 - (b) Metropolitan Life Insurance Company, New York City
Health Bulletins
 - (c) Pennsylvania State College, State College, Pa.
Bulletins 147, 196, 219
 - (d) New York State Agriculture Experiment Station,
Geneva, N. Y.
Circular 93

²²These presuppose an exploratory test as described in Chapter V and a presentation of learning product as described in Chapter VI.

PROGRESSIVE PRACTICES

(e) Pittsburgh District Dairy Council, Pittsburgh, Pa.

List of pamphlets

List of plays

4. Books

(a) Bailey, E. H. S., *Source, Chemistry, and Use of Food*, Philadelphia: Blakiston, 1919

(b) Conn, H. W., *Bacteria, Yeast, and Molds in the Home*, Boston: Ginn and Company, 1912

(c) Hunter, G. W., and Whitman, W. G., *Civic Science in the Community*, New York: American Book Company, 1922

(d) Van Buskirk, E. E., and Smith, E. L., *Science of Everyday Life*, Boston: Houghton Mifflin Company, 1919

(e) Webb, H. A., and Didcott, J. J., *Early Steps in Science*, New York: Appleby, 1924

(f) Wood, G. C., and Carpenter, H. A., *Our Environment*, Boston: Allyn and Bacon, 1927

C. *Subject*: General science

Class level: Junior high school

Learning product: To understand how the movements of the earth affect our life

Contributory understandings:

1. Cause of day and night
2. Cause of seasons
3. Cause of tides
4. How direction is determined
5. How location is determined
6. Use of time
7. Relative positions of earth at dawn, noon, midnight, winter, summer

Learning activities:²³

1. Perceptual experiences

(a) Seeing—visits to observatory, films, slides, pictures, photographs, use of small telescope, plotting moon's position on successive nights, daily course of sun

²³These presuppose an exploratory test as described in Chapter V and a presentation of learning product as described in Chapter VI.

- (b) Hearing—teacher presentation, class reports, lectures
- 2. Reading—United States Government reports and bulletins, text, library and home reading
- 3. Problem solving
 - (a) Constructing a sun dial
 - (b) Constructing a map or globe to illustrate cause of equinoxes and solstices
 - (c) Explaining planisphere
 - (d) Illustrating solar system by diagrams and charts
- 4. Creative self-expression
 - (a) Dramatization of solar system
 - (b) Pupil explanation to class of various phenomena, such as long days of summer, short days of winter

Sources of help and information:

- 1. Films
 - United Projector Film Company, Pittsburgh, Pa.
 - Eclipses of the Sun
 - A Trip to the Moon
 - The Birth of the Earth
- 2. Books
 - (a) Ball, Sir Robert, *In Starry Realms*, Philadelphia: Lippincott, 1892
 - (b) Moseley, E. L., *Trees, Stars, and Birds*, Yonkers-on-Hudson: World Book Company, 1919
- 3. Maps
 - Monthly Evening Star Map Company, 150 Nassau Street, New York City

III. Personal acceptance of worth and value:

A. *Subject:* Art

Class level: Grade VI

Learning product: To accept personally the worth and value of the picture "The Gleaners"

Contributory acceptances:

- 1. A recognition that cheerfulness and industry are often found in the midst of poverty and monotony
- 2. A recognition that an artist can portray these characteristics and conditions

Learning activities:

1. Understanding

(a) Perceptual experiences

(1) Seeing—the picture “The Gleaners,” other pictures by same artist

(2) Hearing—conditions under which picture was painted, characteristics of the peasant people, life of the peasants

(b) Problem solving—under what circumstances cheerfulness and industry appear to best advantage

2. Perceiving personal relationship

Æsthetic-situation activities—sharing in the emotional tone of the artist through (1) preparatory mental set; (2) sympathetic participation with efforts of artist; and (3) finding satisfaction in the result

Sources of help and information:

1. The teacher

2. Other pupils

3. Pupil's background of experience

4. A reproduction of “The Gleaners”

Summary. A learning activity is any learning experience, produced through self-actuated doing. It enables the pupil to attain a desired learning product. The learning activities in general consist of perceptual experiences, reading, reflective thinking, acts of skill, creative self-expression, and the perceiving of a personal relationship. This becomes, then, one of the practices in the Learning-Product Technique: to provide learning activities that will produce the desired learning product.

SUGGESTIONS AND STUDY HELPS

1. Why should the learning products be stated as pupil activities and not teacher activities?
2. Make a list of the learning activities that will produce the learning products you have set up for some subject you plan to teach.
3. Explain why you selected those particular learning activities to produce the learning products.

4. How do you know what particular learning activity will produce a certain learning product?
5. Give an example showing how attainment of a learning product was retarded in some way. For instance, by sickness, low mentality, or deficiency in reading.
6. What educative value is there in special activities such as "Better-English week," "Clean-up week," etc.?
7. Explain how you can select the pupil's learning activities and at the same time provide for creative expression and independent thought.
8. Try out in actual classroom teaching the above suggestions and tell why you found them to be practical.

HELPFUL REFERENCES

- CHARTERS, W. W., *The Teaching of Ideals*. New York: The Macmillan Company, 1927
- DOUGLASS, H. R., *Modern Methods in High School Teaching*, Ch. V. Boston: Houghton Mifflin Company, 1926
- HOLLEY, C. E., *The Teacher's Technique*, Ch. VI-IX. New York: The Century Company, 1923
- MONROE, W. S., *Directing Learning in the High School*, Ch. V-IX and XIII-XIV. New York: Doubleday, Page and Company, 1927
- PARKER, S. C., *Methods of Teaching in High Schools*, p. 109, 199. Boston: Ginn and Company, 1920
- RUGG, H. O., AND SHUMAKER, ANN, *The Child Centered School*. Yonkers-on-Hudson: World Book Company, 1928
- THOMAS, F. W., *Principles and Technique of Teaching*, Ch. IX-XI. Boston: Houghton Mifflin Company, 1927
- TIPPETT, J. S., AND OTHERS, *Curriculum Making in an Elementary School*. Boston: Ginn and Company, 1927

III

DIRECTING THE LEARNING ACTIVITIES

Directing the learning activities. The first practice in the Learning-Product Technique is the setting up of learning products in terms of new ways of behaving to be attained by the pupil. The second practice is providing the learning activities and learning material that will produce the desired learning product. It follows, therefore, that the next practice is directing the learning activities of each pupil so he will attain the learning products set up as ways of behaving.

The ability to learn is present in every normal child. Some pupils learn rapidly, others slowly. Some pupils waste time and effort, others economically use them. Some attain a high degree of skill and ability to do, others remain on a low level of development. Many of the differences between individual pupils may be attributed, not to inability to learn, but to differences in their progress of learning. At any given moment each pupil must be thought of as being somewhere along the line of a progress curve. He may stumble along or he may learn economically and well according as his learning activities are focussed upon and skillfully directed toward the learning products.

Value of directing the learning activities. The value of directing the learning activities has been shown in an experiment by Meek. In this experiment 68 children from three to five years of age were used as subjects in a reading experiment. Six words were selected to be taught: *ball*, *flag*, *doll*, *lion*, *duck*, and *rose*. These words consist of four letters, designate objects of interest to children, and are common in the language of the early school years. For each word

taught, five other words were selected to act as confusing words. Each word of these groups of five words was similar to the word to be taught. The similarity consisted either of an initial letter, a final letter, the first two letters, the middle two letters, or the last two letters. The words are shown in Table I.

TABLE I.—WORD SIMILARITIES¹

SIMILARITIES	I Ball	II Flag	III Doll	IV Lion	V Duck	VI Rose
Initial letter.....	burr	foot	dine	leaf	does	rind
Final letter.....	feel	ring	seal	when	mark	hide
Middle two letters..	sale	clam	sole	riot	much	lost
First two letters	bake	fled	down	like	dump	rock
Final two letters....	kill	drag	bill	moon	sock	case

The words, printed in black primer print on white paper, were pasted on the top of gray cardboard boxes. This made six sets of boxes, one set being used at a time. In each set a toy was put in the box upon which was pasted the word to be taught. For example, in Set I, *ball*, *burr*, *feel*, *sale*, *bake*, *kill*, a ball was put in the box that had the word *ball* on it, the other boxes being left empty. The teacher then told the pupil that all the boxes were empty except one and that box had a surprise in it. The pupil then was shown the box and was asked to open it. When the pupil opened the box he found the ball and usually played with it for a while. The teacher would then close the box, rearrange the six boxes and ask the pupil to find the box with the word on it that says "ball." If the pupil pointed to "ball" the teacher said "yes." If the pupil pointed to another word the teacher said "no" and pointed to the correct word. Throughout the

¹Lois Hayden Meek, *A Study of Learning and Retention in Young Children*, Teachers College Contribution to Education, No. 281, p. 1. New York: Teachers College, Columbia University, 1927. (Quoted with permission of the publisher.)

experiment, the child was started correctly and then was retaught the word if he failed.

Sixty-eight pupils, ages three to five, were tested. During the experiment records were made of the remarks of the children and observations were made of their behavior. These records and observations show quite definitely in some of the cases the effects of failure, dissatisfaction, and emotional disturbance. They indicate in other cases the value of definite teaching and individual help at the point of error. In all cases, however, the records show the value of directing the learning activities. For example, in some instances after a few failures certain pupils became reluctant to recite and would try to go elsewhere to avoid the task. Ofttimes they would hide. However, when their learning activities were directed, they overcame their errors and succeeded in learning the words. Success brought new feelings of satisfaction with attitudes of eagerness to engage again in the reading activity. Two case studies, as made by Meek in this experiment, showing the value of directing the pupil's learning activities are quoted below.

Case 3. E. was a little girl, four years, one month old, with a mental age of five years, seven months, and an intelligence quotient of 124.² She was small for her age, very active, and had an educational rating of 38. She was given 126 trials on six different days but could not learn *ball*. She was restless, inattentive, played with everything within reach. She would not even try to find the word; would just point to any one at random. At the fourth period she did not want to play. She said over and over, "I want to go to my room." Again, she said, "This is enough," and yawned. At the next trial she did not want to come with the experimenter. While playing she yawned and said, "Take me to my room. I want to go." Finally, it was decided to try giving her a cue to see if she could learn the word. Accordingly, the next time after she

²This appears to be an error. To the present writer it seems that the intelligence quotient would be nearer 135.

had been corrected three times the experimenter called her attention to the two tall letters at the end (*ll*) and the tall one at the beginning with a ball on it (*b*). Her next recognition was *kill*. The experimenter called her attention to the *b* in *ball*. Her next two recognitions were *bake*. The experimenter again called her attention to the two tall letters (*ll*). The next time she pointed to *ball* and laughed gleefully. The next time she was again right and said, "I looked and I found it." The remainder of the eight consecutive recognitions were quickly made with a great deal of interest and joy on her part. She had only one other practice period. She came happily, made only one error, and was very much pleased.

Case 4. B. was a little boy, four years, three months old, with a mental age of four years, nine months, and an intelligence quotient of 112. He was immature, under-weight, and shy. He had an older sister who took care of him and did most of his thinking for him. He was extremely slow in his reactions, and sometimes sat in the midst of his work "dreaming." He had seventy-five trials before he recognized *ball* five times consecutively. During these trials he showed no emotional reactions. He would play with his fingers at times, looked around the room, and seemed bored. Sometimes he said he did not want to come but was easily convinced. When he finally recognized it five times consecutively he could not recognize it more than five times. On the next day he refused to play but finally did so quite willingly and only made two errors. The third practice should have come two days later but he was absent and did not get it for five days. At this time he took fifty trials to recognize it twice. The same type of behaviour as for the initial learning is recorded: aimlessly looking around, playing with fingers. The fourth practice he did with only four errors. The fifth practice after an interval of nine days took twenty-seven trials for two recognitions. At the final practice, fourteen days later, he made twenty errors and the experimenter called attention to the "three tall letters," after which he made two correct recognitions.

After B. had had fifty-three trials with *flag* on the initial learning, the experimenter tried some teaching. First, he was shown the technique of looking at each word before selecting. Then he was shown the long tail (*g*) and two tall letters (*fl*) of *flag*. He then pointed twice to *clam*, was corrected and shown the cue letters again. Then followed two correct recognitions. The latter practice periods all

came at the regular time and B. only made one error after this. He was sure of *flag* and selected it carefully. He was very pleased. B. learned *doll* without any help from the experimenter, five consecutive recognitions at the first practice period. At the third recognition he said, "I didn't even think." He made only one error with *doll* in the later practice periods.

Conclusions. Cases 3 and 4 are examples of children who needed to be given definite instruction, who were dissatisfied with the learning situation without instruction but happy when the instruction was given. It was a situation too difficult for these children but when the required help was given they immediately profited. B. was able to get his own cue very definitely for *doll* after he had gotten the idea from *flag*. These definite cues meant for him sure learning in contrast with the hazy, indefinite learning of *ball*.³

Methods of directing the learning activities. Suggestions how the various learning activities may be directed are presented in the present chapter.

a. Ability to do. The learning activities that produce the learning product called "ability to do" consist of two kinds:

1. Getting a correct start.
2. Repetition to the point of automatism.

The methods of directing these two kinds of learning activities are discussed in the pages immediately following.

1. *Getting a correct start.* The general procedures for directing the learning activities in order to get a correct start may be stated as follows:

(a) *Demonstrate the best method of performing the activity and supplement with explanations and directions.* It is generally conceded that there is a certain best method of performing a given activity. In typewriting, for example, there is a certain best method for striking the keys, focussing the eyes, and shifting the carriage. Likewise, in addition, there is a certain best method for carrying and grouping the numbers, and for checking the answer.

³*Ibid.*, p. 83. (Quoted with permission of the publisher.)

If possible the teacher should demonstrate the best method, performing the learning activity slowly, or breaking it into its several parts. This procedure prevents, to a large extent, the wasteful method of trial and error learning. The demonstration by the teacher should be supplemented with explanations and directions. One writer has given an illustration which shows the value and helpfulness of explanations. In learning to do the "snap-up" on the horizontal bar, the students failed entirely under one instructor. The instructor would demonstrate the activity, then ask the students to try. The trial usually resulted in an aimless jerking, kicking, and thrashing around. Later under another instructor the act was not only demonstrated but fully explained and supplemented by specific directions as to the best method of doing it. As a result the students soon made the correct start and learned to perform the activity.⁴

(b) *Give separate training on the difficult points.* The teacher should know in advance, from her own study, the more difficult points in the work and some of the mistakes the pupil is likely to make. The value of giving separate training on the more difficult parts is pointed out by Rowe, who says:

This knowledge must be taken advantage of in economical teaching. Thus a certain point of fingering recognized as troublesome, may be practiced upon separately in learning to play scales on the piano or violin before the scale as a whole is tried. This preliminary practice on the point or points of greatest difficulty also serves to save for the crucial test, time, energy, and satisfaction, which would otherwise be used up or lost in drilling, when there was no need of it.⁵

(c) *Have the pupil perform the activity and correct his errors.* No learning activity involving the "ability to do" can be

⁴S. C. Parker, *Methods of Teaching in High Schools*, p. 109. Boston: Ginn and Company, 1920. (Used with permission of the publisher.)

⁵S. H. Rowe, *Habit Formation and the Science of Teaching*, p. 116. New York: Longmans, Green and Company, 1909. (Quoted with permission of the publisher.)

completely automatized or mastered until the pupil has tried to perform it or to express it. The most important part of the direction of the learning activity, therefore, is to get the pupil to attempt the activity. The learning activity may seem to be easy and yet the pupil may find a number of difficulties. The teacher, however, should not be content merely to point out to the pupil his errors. He should go a step farther and show the pupil how to correct and remove them. Taylor says in his *Psychology of Singing*:

If a teacher says, "That tone is harsh; sing more sweetly," he has given no method to his pupil. He has asked the scholar to change his tone but has not shown him how to do it. If, on the other hand, he directs the pupil to keep back the pressure of the breath or to change the location of the tone—if he instructs him in the correct use of the vocal chords or speaks of the position of his tongue, of his diaphragm, of his mouth, etc.—he gives him method.⁶

2. *Repetition to the point of automatism.* The directing of the learning activities involving repetition of the activity to the point of automatism should consist of the following procedures:

(a) *Give the pupil definite knowledge of the learning product to be attained.* For example, in typewriting a definite learning product should be set up. Such a learning product might be: to type at the rate of sixty words a minute with not more than three errors per hundred words. Very few persons like to work blindly, hence the value of such a goal is apparent. An excellent illustration of the stimulating effect of the pupil knowing the learning product is shown in the experiment by Peterson, page 117. It is there discussed under the chapter title "Focussing the Attention of the Pupil."

⁶D. C. Taylor, *Psychology of Singing*, p. 316. New York: The Macmillan Company, 1908. (Quoted with permission of the publisher.)

(b) *Provide situations as similar as possible to those that life itself offers.* For example, the operations with United States money should be used as early as grades III and IV in connection with the fundamental operations in arithmetic. A pupil can more easily understand a problem involving the cost of three suits at \$22.50 each than he can understand 2250 times 3. Such drill, or repetition of the learning activity, under conditions similar to life situations permits a wide use of genuine and practical problems not only in arithmetic but in all other subjects.

(c) *Provide drill at the point of error.* For example, a pupil may be making little progress in algebra because he has difficulty with changing the signs of quantities on removing a parenthesis preceded by a minus sign. Such an error calls for individual drill at the point of difficulty. A quotation from one of the masters of the piano will further illustrate what we have in mind. Josef Hofmann in his book entitled *Piano Playing* says when learning a new selection, if a part of the selection be forgotten, then:

When you next go to the piano try to play the piece. Should you still get "stuck" at a certain place, take the sheet music, but play only that place (several times, if necessary) and then begin the piece over again. . . . Under no circumstances skip the unsafe place.⁷

(d) *Give drill that is individual in its nature.* Class drill is uneconomical and oftentimes entirely worthless because many pupils are drilled when they have no need for it. Each pupil should be given drill according to his own individual abilities and needs. This suggests the desirability of individualizing the learning activity to meet the individual

⁷Josef Hofmann, *Piano Playing*, p. 24. New York: Doubleday, Page and Company, 1908. (Quoted with permission of the publisher.)

interests and needs of each pupil. This can be accomplished by having individual practice exercises. All such individual drills and practice exercises should be based upon diagnosis of the pupil's difficulties and should be focussed on the points of difficulty and error.

(e) *Attach to the learning activity that is being repeated a pleasurable outcome.* Pleasure in a learning activity tends to establish the activity as a habit. If the pleasure is not inherent in the activity, it oftentimes may be attached artificially. A girl may find the monotonous repetition of type-writing practice to be pleasant because she finds it agreeable to use her fingers in manipulating the keys; or because she believes she will soon be able to earn an independent living; or because of the commendation of parents and friends. Pleasure of some sort should always accompany all repetitions that are to be established as a habit.

(f) *Give the pupil a knowledge of his progress.* Finally the teacher should bear in mind that one of the important principles of learning is that satisfaction increases the ease of learning. One of the ways that satisfaction can be produced is by giving the pupil a knowledge of his progress toward attainment of the learning product. The value of a pupil knowing his progress is fully discussed in Chapter XIII under the chapter title "Showing Progress toward the Learning Product."

3. *Summary.* For directing the learning activities that produce ability to do the teacher should:

1. Get the pupil correctly started.
2. Require repetition of the learning activity to the point of automatism.

b. Understanding. The learning activities that produce

the learning product called "understanding" consist of four kinds:

1. Perceptual experiences
2. The use of reading
3. Problem solving or thinking
4. Creative expression

The methods of directing these four kinds of learning activities are discussed in the pages immediately following.

1. *Perceptual experiences.* The directing of the learning activities based on perceptual experiences should consist of:

(a) *Providing the perceptual experiences.* In providing the perceptual experiences the following may be used as a basis by the teacher for her selection of visual material:

(1) Dramatization. An effective means of affording perceptual experiences is through dramatization. This can be applied to almost any subject, usually arouses interest, and, if kept within reasonable bounds, is an excellent way of intensifying and making more vivid the learning process.

(2) Object teaching. Object teaching can be used effectively in all studies. Such subjects as the manual arts, the domestic arts, fine arts, and the laboratory sciences cannot be studied apart from the concrete objects, plants, and animals with which they deal. All the natural science subjects afford splendid opportunity for activity with concrete objects, specimens, and exhibits related to the subjects.

(3) Pictures. Moving pictures, slides, stereoscope views, pictures of still life, land and water scenes, all have certain advantages and should be used extensively whenever available.

(4) Models, charts, maps, diagrams, and graphical representations all have special advantages since they show facts that the real objects cannot exhibit.

(5) Certain visual and oral perceptions can be experienced through presentation of symbols and examples illustrating facts, principles, and meanings found in the lesson. For example, equations in chemistry, or problems in algebra.

A careful consideration of the nature and scope of perceptual experiencing by means of visual materials should impress the teacher with its great value both to the teacher and the pupil. A complete discussion of perceptual experiencing through visual material, and its value as a means of associating meaning with understanding, is presented in Chapter VIII, "Using Visual Material as an Aid in Learning."

(b) *Developing an appropriate mental set.* Every teacher should adopt as an important principle: "Prepare the pupil for each perceptual activity that is offered him." The mere presentation of an object is not enough to insure an understanding of it. The pupil must be prepared so he will know what to look for and how to look for it. This is especially true of pictures, particularly of moving pictures. Unless the pupil has had his mind prepared in advance, he is likely to be interested only in a purely sensory way. It becomes necessary for the teacher, therefore, to explore the pupil's background of experiential knowledge and then prepare him along whatever lines needed. This may be done through an exploratory test,⁸ or it may be done by asking appropriate questions immediately before the perceptual experiencing is begun. In the latter method, the pupil may be stimulated to recall former experiences and knowledge; he may be told new items of knowledge; or he may be directed to read certain definite references. In all instances, however, the teacher should direct the learning activity involving perceptual experiences by developing in the pupil an appropriate mental set.

(c) *Planning for effectiveness.* In planning for the use of

⁸See Chapter V, "Individualizing the Learning Activities."

perceptual aids in directing learning the teacher should be careful to plan out all the major details in order to insure effective stimulation and response. It is obvious that certain objects cannot be brought into the classroom, hence the pupil must be taken to such objects. Field trips, visits to the museum, and visits to industrial plants and commercial organizations are of such a nature that they require careful planning in order to be effective.

In all forms of demonstration teaching the teacher must be sure that the essential parts of the demonstration can be easily seen by each member of the class. The teacher must be certain, also, that the demonstration will be reasonably successful. A demonstration that does not work is worse than no demonstration.

No object, or picture, should be so interesting in itself that the pupil will fail to see the idea, or principle, which the object is planned to illustrate. Pictures, especially moving pictures, have this disadvantage. Ofttimes they become merely a form of entertainment.

2. *Reading.* The directing of the learning activities that utilize reading consists on the part of the teacher of:

(a) *Stating the purpose of the reading.* The purposes for which the teacher should ask the pupil to do reading have been formulated by Monroe and are restated, slightly condensed, as follows:

I. Reading to understand. When reading is considered as a learning activity, it is commonly assumed that the reader's purpose is to understand, *i.e.*, to bring into his consciousness the ideas, facts, and principles which the words and phrases of the text represent and to synthesize these elements of knowledge into the meaning of sentences and paragraphs.

II. Reading to remember. "Reading to remember" may be contrasted with "reading to understand." The former does not exclude the understanding of what is read, but the reader's attention

is focussed upon remembering the ideas, facts, and principles in terms of the symbols used to express them.

III. Searching for information. This reading purpose exists when a student has in mind certain specific questions and reads for the purpose of finding the answers to them, or at least of securing information or other assistance.

IV. Critical attitude toward statements of author. A critical attitude is not a fault-finding attitude. It means that the reader applies certain tests to the statements of the author. He compares them with his experience and statements made by other persons; he examines them for accuracy and precision of statement; he judges them with reference to their logical sequence; he considers their implications.

V. Supplementing the text. In addition to understanding the text, the reader endeavors to assimilate the ideas, facts, and principles brought into his mind by orientating them with reference to each other and to items of knowledge previously acquired.

VI. Analytical study of text. In an analytical study of a textbook, the reader usually focusses his attention upon phases of language form, such as spelling, rhetorical structure, and grammatical usage.

VII. Reading for enjoyment. Although exceptions can be cited, a person reading for enjoyment tends to disregard those things that do not promise enjoyment. He is seldom critical; he may skip difficult words or even sentences; he is not likely to make an effort to remember; usually he reads rapidly; he seldom gives attention to matters of form.⁹

(b) *Giving definite directions what to do in order to attain the stated purpose.* In order for the pupil to attain the stated purpose in reading, the teacher should give definite directions what to do. Monroe suggests the following directions, based upon the seven types of purposes stated above:

I. Reading to understand is encouraged by:

1. Thought questions that afford opportunities for the application of the ideas, facts, and principles expressed in the text.

⁹W. S. Monroe, *Directing Learning in the High School*, p. 195. New York: Doubleday, Page and Company, 1927. (Quoted with permission of the publisher.)

2. Requests to determine topic sentences or principal ideas and to give reasons for the selections made.
3. Requests to prepare an outline or a summary.
4. Requests to read for purpose of explaining text to the class or to some other audience.
5. Requests to determine author's purpose or problem.
6. Requests to draw an illustrative diagram or map.
7. Requests to prepare a list of questions that the text answers.

II. Reading to remember is encouraged by:

A. Learning exercises

1. Questions that are explicitly answered by the text.
2. Requests to prepare for a debate or discussion of a specified topic.
3. Requests to underline or check statements judged to be important.

B. Test exercises

1. Requests to reproduce the text read, either in free expression or in response to specific questions such as: What does the author say about . . .? Discuss . . . (a topic discussed in text).
2. True-false, completion, multiple-choice, and most other kinds of "new examinations."
3. Requests to summarize or outline the text from memory.

III. Searching for information is encouraged by:

1. Requests to prepare reports on specified topics.
2. Questions that are answered by the text although not explicitly stated by the author.
3. Questions requiring the collecting of information as a basis for a judgment such as: Is the author unprejudiced in his discussion? What is the author's attitude toward . . .?
4. Requests to complete a skeleton outline, especially when the items must be secured from different sources.

IV. Reading with a critical attitude is encouraged by:

1. Thought questions such as: Is the author consistent? Is he justified in his statement? Would the author agree with . . .?
2. Requests to compare events, persons, etc.
3. Requests to compare two or more texts.
4. Requests to evaluate portions of a text.

5. Requests to compare author's view with student's experiences and beliefs.
 6. Requests to explain meaning of words, phrases, or sentences as used by author. (Usually employed as test exercises.)
- V. Supplementing the reading of a text is encouraged by:
1. Requests to prepare an explanation of statements in text.
 2. Requests to prepare illustrations of statements in text.
 3. Requests to supply reasons for statements by author or to fill in other gaps in his trend of thought.
 4. Requests to determine implications or consequences of statements by author.
- VI. Analytical study of text is encouraged by:
1. Requests to determine how emphasis is secured.
 2. Requests to note choice of words (diction) and sentence structure.
 3. Requests to compare the style of one author with that of another.
 4. Requests to identify or to prepare lists of figures of speech, or other items of form.
 5. Requests to correct errors. (This assumes that errors exist in the text.)
 6. Requests to determine the origin of words.
- VII. Reading for enjoyment is encouraged by:
1. Requests to select a story or book which the student enjoys and which he thinks the other members of the class would enjoy.
 2. Inquiries concerning characters or portions of material read which were enjoyed most.
 3. Requests to make out a list of books to recommend to other students or adults.¹⁰

3. *Problem solving.* For directing the learning activities based on problem solving Parker has offered several practical suggestions. He says:

To stimulate and assist pupils in carrying on reflective thinking the teacher should:

¹⁰*Ibid.*, p. 200. (Quoted with permission of the publisher.)

- I. Get them to define the problem at issue and keep it clearly in mind.
- II. Get them to recall as many related ideas as possible by encouraging them:
 1. To analyze the situation,
 2. To formulate definite hypotheses and to recall general rules or principles that may apply.
- III. Get them to evaluate carefully each suggestion by encouraging them:
 1. To maintain an attitude of unbiased, suspended judgment or conclusion,
 2. To criticise each suggestion,
 3. To be systematic in selecting and rejecting suggestions, and
 4. To verify conclusions.
- IV. Get them to organize their material so as to aid in the process of thinking by encouraging them:
 1. To "take stock" from time to time,
 2. To use methods of tabulation and graphic expression, and
 3. To express concisely the tentative conclusions reached from time to time during the inquiry.¹¹

4. *Creative expression.* The directing of the learning activities involving creative self-expression consists of:

(a) *Providing the proper environment.* The teacher must provide the proper environment where the creative expression can develop freely and spontaneously. The pupil must find in the teacher one to whom he can freely go, one who has the belief that he can create, one who has the ability to help him put his thoughts into proper form after they have been expressed. Only where there is an environment conducive to joyous, spontaneous self-expression can the creative inner urge find expression and grow.

(b) *Letting the self-expression assume whatever form the pupil desires.* The pupil should be left to himself in his self-

¹¹S. C. Parker, *Methods of Teaching in High Schools*, p. 199. Boston: Ginn and Company, 1920. (Quoted with permission of the publisher.)

expression. This does not mean that there is to be no guidance on the part of the teacher. The teacher should encourage, stimulate, and suggest ways and forms of expression. But there should be no effort on the part of the teacher to influence the pupil. The teacher must not try to impose his own notions upon the pupil. He must not inject into the pupil's imagination what he thinks the pupil should create. The result, if this be done, will be imitation. It is not imitation but the spontaneous expression of a creative inner urge that is desired.

(c) *Helping the pupil improve the technique of his self-expression.* After the inner urge has found expression in drawing, modeling, writing, poetry, music, or whatever form it assumes, then the teacher should help the pupil improve the form of the expression, smoothing it here, strengthening it there. The technique for doing the thing should follow the self-expression, not precede. Whenever emphasis is laid upon technique then the situation becomes a problem solving one and the expression of a creative inner urge is stifled.

5. *Summary.* For directing the learning activities that produce understanding the teacher should:

(a) Provide perceptual experiences, develop in the pupil an appropriate mental set, and plan for effectiveness.

(b) State the purpose of the reading and give definite directions what to do in order to attain the stated purpose.

(c) Have the pupil define the problem, recall related ideas, evaluate each suggestion, and organize his material.

(d) Provide the proper environment for creative self-expression, let the self-expression assume whatever form the pupil desires, and help the pupil improve the technique of his self-expression.

c. Personal acceptance of worth and value. The learning activities that produce the learning product called "personal acceptance of worth and value" consist of three kinds:

1. The ability to do
2. Activities that involve understanding
3. The perceiving of personal relationship

The methods of directing these three kinds of learning activities are discussed in the pages immediately following.

1. *Activities involving ability to do.* The directing of these activities is discussed on pages 52-56 of this volume.

2. *Activities involving understanding.* The directing of these activities is discussed on pages 56-64 of this volume.

3. *The perceiving of personal relationship.* The directing of the activities that involve the perceiving of personal relationship with the thing that is to be recognized and accepted as being of worth and value is based upon five principles.¹² These five principles are:

(a) *Diagnosing the situation.* This means to find out what is preventing the personal acceptance of worth and value. This requires diagnosing the situation in the case of each pupil. The diagnosis should not only reveal the cause for the lack of the personal acceptance but should also establish a basis upon which there may be built a desire for the thing that is considered to be worth while.

(b) *Creating the desire.* This means that the pupil should be caused personally to accept the fact that the thing is worth while. Charters says in order to do this:

The new trait must be associated with those other activities which now give satisfaction to the child. In other words, we apply the techniques of satisfaction and discomfort. Therefore we study our

¹²W. W. Charters, *The Teaching of Ideals*, p. 5. New York: The Macmillan Company, 1927. (Used with permission of the publisher.)

pupil to discover his likes and dislikes and seek so to condition them that the trait becomes enmeshed among them. Specifically, if I wish to develop habits of cleanliness in a junior high-school boy who dislikes the trait, I shall first of all use the aforementioned check list of interests, let us say, to discover the ends for which he already has strong desires. I may find that among other things he wants to be elected to an honor society, to set a good example to a younger brother, to be popular with the girls, and to escape ridicule. My only hope is to make him realize that he cannot successfully carry on the pleasurable activities or avoid the unpleasant ones unless he becomes clean. If I find no interesting values whose possession is conditioned by cleanliness, he will pay no attention to the matter. If, however, I am able to make him see that the honor society will not elect a dirty applicant, that his sweetheart will be pleased and proud of his cleanliness, or if I subject him to ridicule because of dirty hands and neck, I can make him desire cleanliness.

Reasoning. Reasoning plays an important role in creating desire because through reason we *see* the connection between the new ideals and the happy family of ends and actions in which we are already interested; but suggestion, example, and personification provide other means of making these connections.

In brief, then, all activities are accompanied by feelings and emotions, and these are transferred through conditioning and through association to new activities when they are felt to be related, with the result that the new ideal obtains accompanying feelings or emotions of its own.¹³

(c) *Developing a plan of action.* This means application to situations with a plan of action mapped out. If the teacher desires actually to develop a personal acceptance of worth, it is necessary to show the pupil how to apply that learning product to a specific situation. Charters says that the story of Sir Walter Raleigh, Queen Elizabeth, the cloak, and the mud puddle is of little value, in itself, to the pupil, because it is hard for the average pupil to find such a combination

¹³*Ibid.*, p. 239. (Quoted with permission of the publisher.)

to-day.¹⁴ Application of the inherent worth-whileness of courtesy should be made, therefore, to practical situations involving courtesy in a crowded street car, or similar life situations.

(d) *Requiring practice.* This means to sustain the desire so it does not fluctuate. A pupil may know how to be neat and may want to be neat, but something may prevent him from being so at particular times. Eventually this may cause him to lose the desire. A sustained desire which does not fluctuate requires consistent practice. Even so, a sustained desire can be maintained only if the attainment of the learning product brings satisfaction. It is well, therefore, to reward a pupil by praise, or appreciative notice.

(e) *Integrating personality.* This means that the learning product must become a part of the total of the pupil's personality. He must act in the light of his understandings. The activity must function in as many situations as possible. Failure to generalize a learning product and make it apply to several types of situations is a common occurrence. A pupil may be polite in school and discourteous at home; a pupil may be orderly with the regular teacher and disorderly with the substitute teacher. The pupil must know not only how to apply the learning product to a particular situation but to many situations. In a recent city-wide campaign for planting trees and clearing away rubbish, a teacher remarked that the pupils in her room failed to be neat in the schoolroom. It may be assumed, therefore, that they had failed in generalization of the ideal of neatness.¹⁵ Charters says:

Teach a man to think, and integration will take care of itself; for it is through reasoning that we set up and modify our final goals,

¹⁴W. W. Charters, "Five Factors in the Teaching of Ideals"; *Elementary School Journal*, 25 (December, 1924), p. 264. (Used with permission of the publisher.)

¹⁵*Ibid.*, p. 264. (Used with permission of the publisher.)

settle conflicts among our ideals, discover principles of action, and evolve efficient methods of behavior. The tendencies with which we are born will not carry us far along the road to integrity; the major portion of the way is covered by intelligence and reason.¹⁶

4. *Summary.* For directing the learning activities that produce personal acceptance of worth and value the teacher should:

(a) Direct (as provided on page 52) the activities that will produce the ability to do.

(b) Direct (as provided on page 56) the activities that will produce understanding.

(c) Bring about the perceiving of personal relationship between the pupil and the learning product by: (1) diagnosing the situation; (2) creating the desire; (3) developing a plan of action; (4) requiring practice; and (5) integrating the pupil's personality.

It is not sufficient that the teacher set up learning products in terms of new ways of behaving to be attained by the pupil. The learning activities of each pupil must be directed toward attainment of the ways of behaving. This becomes, then, one of the practices in the Learning-Product Technique: to direct the learning activities of each pupil so he will attain the desired learning product.

SUGGESTIONS AND STUDY HELPS

1. How can the teacher provide situations similar to those of life?
2. Should the class work be made interesting or should it be based on the interests of the pupil?
3. How can you give a pupil knowledge of his progress?
4. Does the teacher or do the physical surroundings constitute the main part of the pupil's environment?
5. How can you diagnose the situation to find out what ideals the pupil lacks?

¹⁶W. W. Charters, *The Teaching of Ideals*, p. 341. New York: The Macmillan Company, 1927. (Quoted with permission of the publisher.)

6. How can you direct the learning activities and at the same time provide for creative self-expression?

7. Why should you take time to direct the pupil's reading activities outside of the regular reading lesson?

HELPFUL REFERENCES

CHARTERS, W. W., *The Teaching of Ideals*. New York: The Macmillan Company, 1927

DOUGLASS, H. R., *Modern Methods in High School Teaching*. Boston: Houghton Mifflin Company, 1926

MONROE, W. S., *Directing Learning in the High School*. New York: Doubleday, Page and Company, 1927

MORRISON, H. C., *The Practice of Teaching in the Secondary School*. Chicago: University of Chicago Press, 1926

PARKER, S. C., *Methods of Teaching in High Schools*. Boston: Ginn and Company, 1920

IV

RECOGNIZING INDIVIDUAL DIFFERENCES

Individual differences among pupils. The observant teacher requires no extended discussion to establish the fact that individual differences exist among pupils. The differences are especially marked in features, behavior, and dress. There are usually the tall and the short pupils; the quiet-mannered and the ill-behaved; the well dressed and the ones with poorer clothes.

As these same pupils enter into their various school activities it is just as evident that they also differ in their reactions to the classroom work. Some are conspicuous for their facility in mastering the learning activities; others are just as conspicuous for their slowness with the learning activities. In an unselected class of forty pupils it is very likely that one pupil may be able to solve seven times as many problems in a given time as another pupil; or one pupil may be able to read twelve times as fast as another pupil; or one pupil may have a vocabulary three hundred per cent larger than another pupil has. An activity that is too hard for one pupil, therefore, may be too easy for another pupil in the same class. It is obvious that, if such pupils are held to the same assignment, learning will not take place. No two pupils are ever alike in their learning development or in their classroom achievements.

The ability to learn is present in every normal child. The differences between individual pupils may be attributed, not to inability to learn, but to differences in their progress of learning. They have simply progressed to different levels of development. At any given moment each pupil may be thought of as being somewhere along the line of a progress

curve. The result from a test of any kind merely indicates the level of development to which the pupil had progressed at the time of the test. This stage of development may be high or low along the rise of the learning curve. The crucial

TABLE II.—DISTRIBUTION OF 687 PUPILS OF GRADE V, ACCORDING TO THE NUMBER OF ADDITION PROBLEMS SOLVED¹

PROBLEMS SOLVED	PUPILS
35	2
34.....(Grade VIII median, 33.9).....	4
33	1
32.....(Grade VII median, 32.4).....	8
31	13
30.....(Grade VI median, 29.7).....	13
29	26
28	35
27	32
26	46
25	40
24	54
23.....(Grade V median, 23.0).....	75
22	64
21	77
20	54
19	49
18.....(Grade IV median, 18.3).....	43
17	28
16	10
15.....(Grade III median, 14.5).....	7
14	3
13	0
12	1
11	1
10	0
9	0
8	0
7.....(Grade II median, 6.8).....	0
6	0
5	1
4	1

¹Clifford Woody, *Measurements of Some Achievements in Arithmetic*, Teachers College Contribution to Education, No. 80, p. 41. New York: Teachers College, Columbia University, 1916. (These data are selected from an extensive study by Woody and used with permission of the publisher.)

question for the classroom teacher is: "How far along the curve is the pupil in relation to the learning product?"

Examples of individual differences. In the following pages there are presented examples of individual differences among pupils relative to their attainment of the learning products. The examples are grouped around each type of learning product that the pupils were trying to attain.

a. Individual differences in ability to do. 1. *Arithmetic.* Variation in progress toward attainment of the learning product is often so wide that it includes ability to do that is representative of every grade level in school. In a study of 687 pupils of grade V, Woody found progress in attainment, based upon the Woody Arithmetic Tests, to range from below grade II attainment to above grade VIII attainment. The result from the test in addition is shown in Table II.

Uniformity of ability to add is as impossible as it is undesirable. What a teacher should realize is that pupils are scattered at various points along the rise of a learning curve in *ability to add* and that it is her function not to attempt uniformity but to start with each pupil where he is and to give him the best methods in adding that have been developed.

2. *Handwriting.* Graphic illustration of individual differences in rate of progress toward attainment of the learning product is given in Table III. This table shows the variation of progress in handwriting among 1839 pupils in the third and fourth grades of the Detroit schools.

Table III should be read as follows: At the end of the first six weeks of the semester, eight per cent of the 3B-X pupils were still working on Lesson 1; fifteen per cent on Lesson 2; nineteen per cent on Lesson 3; etc.

Table III shows, not uniformity of progress, but a very wide range in progress for each X, Y, and Z group within

TABLE III.—INDIVIDUAL PROGRESS IN HANDWRITING

PER CENT OF CHILDREN IN EACH GRADE COMPLETING SUCCESSFULLY THE NUMBER OF LESSONS INDICATED. BASED ON RECORDS OF 1839 CHILDREN²

LESSON	GRADES AND GROUPS											
	3 B			3 A			4 B			4 A		
	X	Y	Z	X	Y	Z	X	Y	Z	X	Y	Z
1	8	4	5	3	1	1	2	4	8	2	4	3
2	15	16	25	5	4	6	6	7	6	4	5	5
3	19	24	22	7	7	14	10	16	13	7	6	14
4	18	22	12	12	13	18	14	16	18	10	10	7
5	15	18	12	13	18	17	12	17	17	15	13	24
6	19	6	12	13	15	14	9	19	15	17	14	21
7	0	4	7	15	13	14	13	8	11	15	15	11
8	4	3	0	8	9	5	12	5	8	9	10	7
9	2	3	5	9	7	3	9	4	3	6	8	1
10				2	4	3	6	0	1	4	4	2
11				3	3	2	4	1		3	5	1
12				5	3	1	1	2		5	3	3
13				3	2	2	2	1		1	1	
14					1					1	2	1
15				2						1	0	

each grade. Such variations in progress necessitate that the learning activities involving writing be individualized so that pupils may progress at their own optimum rate.

3. *Beginning reading.* In Table IV is presented the time required by 116 pupils to finish a series of lessons in beginning reading. These 116 pupils of grade IB were grouped into four sections, A, B, C, and D, upon the basis of their intelligence ratings.

Table IV is to be read as follows: 33 per cent, or five pupils, rated A, finished the series of lessons in 10 to 19 days; 20 per cent, or three pupils, finished in 20 to 29 days; etc.

The actual time required varied from 12 to 77 days. The

²Stuart A. Courtis, "Data on Ability Grouping from Detroit"; *Twenty-fourth Yearbook of the National Society for the Study of Education*, Part II, p. 144. Bloomington, Illinois: Public School Publishing Company, 1925. (Quoted with permission of the editor.)

TABLE IV.—RELATION BETWEEN INTELLIGENCE AND TIME REQUIRED TO FINISH A SERIES OF INDIVIDUAL LESSONS IN BEGINNING READING BASED UPON THE RECORDS OF 116 GRADE IB PUPILS. NUMBERS EXPRESS PERCENTAGES OF THE INTELLIGENCE GROUPS³

DAYS REQUIRED TO FINISH	INTELLIGENCE RATINGS			
	A	B	C+, C, C—	D, E
10-19	33	16	3	
20-29	20	19	12	
30-39	27	36	34	
40-49	13	16	20	
50-59	7	10	21	33
60-79	0	3	10	67
Total.....	100	100	100	100
Cases.....	15	31	67	3

first third of section A finished the series within 19 days, while the first third of Section D required over 50 days.

That there are large individual differences in the progress of pupils as shown by Table IV must be recognized by every teacher. Adequate provision should be made to individualize the learning activities to meet the ability to progress of each pupil. If this were done, each pupil, in accordance with his learning ability, would be able from his present level of development in reading to progress along the rise of a learning curve toward attainment of the learning product.

4. *Reading.* Table V shows the scores and distribution of nineteen pupils in grade III reading as tested by the Burgess Picture Supplement Scales for Measuring Ability in Silent Reading.

From a comparison of the scores in Table V with the grade standards it is seen that the nineteen pupils grouped themselves into two divisions, those needing drill in speed and those needing drill in careful reading. Furthermore,

³*Ibid.*, p. 144. (Quoted with permission of the editor.)

TABLE V.—DISTRIBUTION OF 19 PUPILS, GRADE III, ON THE BURGESS READING SCALES, SHOWING AMOUNT OF DRILL NEEDED BY EACH PUPIL⁴

	ATTEMPTS	MUCH DRILL IN CARE				SOME DRILL IN CARE	NO DRILL IN CARE	
		6 or More Wrong	5 Wrong	4 Wrong	3 Wrong	2 Wrong	1 Wrong	0 Wrong
NO DRILL IN SPEED	20	—	—	—	—	—	—	—
	19	—	—	—	—	—	—	—
	18	—	—	—	—	—	—	—
	17	—	—	—	—	—	—	—
	16	—	—	—	—	—	—	—
	15	—	—	David	—	—	—	—
	14	—	—	—	—	—	—	—
	13	—	Theodore	—	Peter	—	John	—
	12	—	—	—	—	—	—	—
	11	—	—	—	—	—	Henry	—
	10	—	—	—	—	Barbara	—	—
	9	—	—	—	Marjory	—	—	—
	8	Francis	—	—	—	—	Elizabeth	Janet
	7	—	—	—	—	—	Charles	Tim
	7	—	—	—	—	Lucille	—	—
SOME SPEED DRILL	6	—	—	—	—	Fred	—	Helena
	5	—	—	—	—	—	Winthrop	Bancroft
MUCH DRILL IN SPEED	4	—	—	—	—	—	—	—
	3	—	—	—	—	—	—	—
	2	—	—	—	—	Douglas	—	—
	1	—	—	—	—	Ruth	—	—
	0	—	—	—	—	—	—	—

each division was composed of three groups, those needing (1) much drill, (2) some drill, and (3) no drill. It is evident, therefore, that each of these groups should have individual learning activities set up and the instruction adapted to the needs of each pupil. For example, John who tried 13 paragraphs and marked 12 of them correctly, receiving a score of 92, does not need the same type of drill as Ruth who tried only 2 paragraphs and marked neither of them correctly, receiving a score of 0. Neither does Theodore who tried 13 paragraphs and got only eight correct need the same type of drill as Janet who tried only 8 paragraphs but got all correct. Both Theodore and Janet got the same number correct and so received the same score. However, Theodore

⁴May A. Burgess, "Classroom Grouping for Silent Reading Drill"; *Elementary School Journal*, 22 (December, 1921), p. 275. (Quoted with permission of the publisher.)

needs drill in slow, careful reading and Janet needs drill in rapid reading. In other words, *each should have the learning activities individualized to his or her needs.*

5. *Spelling.* Individual differences in spelling ability are as great as in any other subject. In a recent study Guy found the ability to spell of 979 pupils of grade IIIA varied from zero ability to that of ninth-grade ability. The test consisted of twenty-five words selected from the Buckingham Extension of the Ayres Scale in Spelling, one word from each column, beginning with column H and ending with column AF. The words were as follows:

1. sit	6. dress	11. combination	16. appreciate	21. incessant
2. miss	7. capture	12. motion	17. receipt	22. embarrassment
3. happy	8. afraid	13. agreement	18. accommodate	23. hippopotamus
4. rain	9. awful	14. whether	19. allege	24. inflammable
5. warm	10. engage	15. discussion	20. cauliflower	25. dissension ⁵

These twenty-five words were spelled by 4292 pupils of grade IIIA. From the spelling papers of these pupils there were selected at random 979 papers. The scores of the 979 pupils are shown in Table VI.

The average score was 8.1 words. This does not tell the whole story however. A mere statement that the IIIA grade had an average score of 8.1 words correct does not reveal the fact that the spelling abilities of the 979 pupils in this grade ranged from 0 to 20 words spelled correctly. In other words, one pupil spelled incorrectly every word he tried, while another pupil spelled 20 of the 25 words correctly, reaching the average score of grade XI, the junior year in high school.

Since some of the pupils in this third grade could not spell as well as some in the second grade, and since others could spell as well as some in the eleventh grade in high school, it

⁵J. Freeman Guy, "Spelling Survey"; *Pittsburgh Public Schools*, Bulletin No. 5, p. 43. Pittsburgh: Pittsburgh Public Schools, 1924. (Quoted with permission of the publisher.)

TABLE VI.—DISTRIBUTION OF 979 PUPILS IN GRADE IIIA SPELLING⁶

NUMBER OF WORDS SPELLED	NUMBER OF PUPILS
25	0
24	0
23	0
22	0
21.....(12A average, 20.7).....	0
20.....(11A average, 19.9).....	1
19.....(10A average, 19.2).....	1
18.....(9A average, 18.7).....	2
17.....(8A average, 17.8).....	3
16.....(7A average, 16.3).....	5
15	8
14.....(6A average, 14.6).....	18
13	32
12.....(5A average, 12.2).....	38
11	79
10.....(4A average, 10.3).....	86
9	126
8.....(3A average, 8.1).....	145
7	146
6	125
5.....(2A average, 5.4).....	82
4	45
3	23
2	8
1	5
0	1

is evident that these pupils of grade IIIA should not be drilled upon the same list of words. The teacher should make provision for meeting such a wide range of individual differences in spelling ability as revealed in this study. This could readily be done by individualizing the learning activities in spelling to meet the spelling needs of each pupil.

b. Individual differences in understanding. 1. *Concept test.* Those who have made studies of the content of pupils' minds have been astonished at the large variation of under-

⁶*Ibid.*, p. 32. (These data selected and arranged from an extensive study by Guy and used with permission of the publisher.)

standing about common objects. A recent study by Huff shows the exact number of percepts of common objects that some children really have. In this study, 840 pupils from the kindergarten to grade VIII, inclusive, were given the test shown below.

CONCEPT TEST

(Instructions to teachers)

Check as plus, all concepts known: as minus, all not known.

Let the test of knowledge be awareness of the form, and size, or utility, and place of existence.

For example:

The child who says a sparrow is a small bird would be scored plus.

If he says "growing wheat is what is made into bread" he would score plus. If he says "a frog is an animal" but can give no clearer idea of it, he would be scored minus. The purpose is to determine whether the child could secure a proper concept from hearing, sight, taste, smell, or touch stimulation.

- | | |
|------------------------------|----------------------|
| 1. Beehive | 11. Cow |
| 2. Crow | 12. Growing wheat |
| 3. Bluebird | 13. Apple tree |
| 4. Ant | 14. Growing potatoes |
| 5. Robin | 15. Growing grapes |
| 6. Sparrow | 16. Fish |
| 7. Sheep | 17. Grass |
| 8. Bee | 18. Seeds |
| 9. Frog | 19. Butter |
| 10. Worm | |
| Where are the— 20. Ankles | 26. Knuckles |
| 21. Knees | 27. Cheek |
| 22. Shoulders | 28. Forehead |
| 23. Hips | 29. Throat |
| 24. Teeth | 30. Stomach |
| 25. Ears | 31. Ribs |
| Which is the— 32. Right hand | |
| 33. Left foot | |

- Has he seen a—
- 34. File
 - 35. Plow
 - 36. Churn
 - 37. Hoe
 - 38. Bricklayer at work

Does he know—

- 39. Leather comes from animals
- 40. Origin of cotton things
- 41. What flour is made of
- 42. Shape of the world
- 43. Origin of woolen things
- 44. Origin of paper
- 45. Origin of butter
- 46. Origin of eggs (used for ordinary food)
- 47. Source of milk
- 48. Source of sugar
- 49. Source of silk
- 50. An island
- 51. A beach
- 52. A lake
- 53. A statue
- 54. A bridge
- 55. A tunnel
- 56. Origin of telegraph pole
- 57. Copper wire
- 58. Coal
- 59. Water in faucet
- 60. Gas in stove
- 61. Iron in fire plug
- 62. Source of meat on table
- 63. What makes the clock go
- 64. What makes the street car go
- 65. Red
- 66. Orange
- 67. Yellow
- 68. Green
- 69. Blue
- 70. Brown
- 71. White
- 72. Black
- 73. Gray

In terms of mental ages of the pupils, the results of the test indicate the following:

	YEARS	SPAN (OF PERCEPTS KNOWN)
Those with mental age of	6	20-59
	7	20-69
	8	30-69
	9	40-73
	10	40-69
	11	40-73
	12	30-73
	13	50-73

	YEARS	SPAN (OF PERCEPTS KNOWN)
Those with mental age of	14	40-73
	15	50-73
	16	60-73
	17	.....
	18	60-69
	19	70-73 ⁷

This study of the content of children's minds shows the large variation in understanding among pupils who are of the same mental age. For example, the pupils having a mental age of six years varied in their understandings from 20 to 59 percepts, a range of 39 percepts. Moreover, some of these pupils with mental age of only six years knew as many of the percepts (59 in number) as did some of the pupils whose mental age was as high as fifteen years.

From evidence such as the above, one may infer that each pupil had climbed to a different level in his progress along the line of a learning curve. A teacher must make some provision for meeting such a wide variation of individual differences in understanding. This can be done by individualizing the learning activities to meet the level of development of each pupil.

2. *English composition.* Of all school subjects, English composition, perhaps, is the one subject in which individual variation is widest. Burt, in his *Mental and Scholastic Tests*, gives two compositions each written by a ten-year-old pupil. The compositions were based upon Watt's picture called *Hope* and are shown below without change in spelling or punctuation. The first composition is by a boy of ten who wrote:

Was a pon a tim a putr of a lrg sitndan was out a bot ro stne no.

⁷R. L. Huff, "Percept Content of School Children's Minds"; *Pedagogical Seminary*, 34 (March, 1927), 129. (Quoted with permission of the editor.)

He probably was trying to say:

Once upon a time a picture of a girl sitting down without any boots or stockings on.⁸

The second composition is by a girl of the same age, living in the same neighborhood. Her essay composed under precisely similar conditions, with the same picture in front of her and with the same allowance of time, is as follows:

HOPE

Sublimely, majestically sorrowful she seems. Yet her name is Hope. Cowering low, not in submission to Fate, but longing for happiness, she sits, blind-folded, and fingers, lovingly and musingly, the one vibrating string of her lyre, striving to create some sweet melody. The first beam of sunshine is kissing her feet; and in her inmost soul she wonders whether the time will come when it will kiss her drooping head.

She is the good spirit of the world, and the ruler of the minds of those who dwell in it. In the darkest hour of night she visits us, and helps us to wait patiently for dawn and the light.

Hope cannot read the future. But the morning star, the eye of heaven, is the prophet; and though Hope cannot see it, she feels its light shining in her heart. It puts into her soul dreams of happiness, thoughts of the realization of her ideals, and the winning of eternal bliss.

In the most unhappy moments of the life of man, she comes to him, drives away despair, and teaches him patience. She is like a sparkling and refreshing fountain to a thirsty flower, or a light seen in the darkness of some weary footsore traveler.⁹

These two compositions on *Hope* give a vivid illustration of the vast range of individual achievement found between pupils of the same age. That such differences in understanding do exist is a fact that can no longer be ignored. The learning activities must be individualized. Class teaching

⁸Cyril Burt, *Mental and Scholastic Tests*, p. 332. London: King and Son, 1922. (Quoted with permission of the publisher.)

⁹*Ibid.*, p. 332. (Quoted with permission of the publisher.)

must give way to *individualized teaching* in order better to meet such wide range of differences as shown on preceding page.

3. *English.* In a study by Howarth reported by Horn, a record was kept of the progress made by 40 pupils of grade V in completing three exercise books in English. The rates of progress made by individual pupils varied greatly. In Table VII is shown the rate of progress of eleven pupils, all of whom made an initial score of 12 on the Trabue Test.

TABLE VII.—NUMBER OF 30-MINUTE PERIODS TAKEN PER EXERCISE BOOK BY ELEVEN PUPILS, ALL OF WHOM SCORED 12 IN THE PRELIMINARY TEST¹⁰

PUPIL NUMBER	PRELIMINARY TEST TRABUE	BOOK 1	BOOK 2	BOOK 3	TOTAL
1	12	19	19	6	44
2	12	17	10	10	37
3	12	18	13	14	45
5	12	18	13	18	49
6	12	17	14	6	37
19	12	20	11	9	40
22	12	13	9	8	30
29	12	16	18	11	45
32	12	18	14	19	51
33	12	32	20	8	50(Sic)
36	12	23	16	9	48

It is clearly seen that these eleven pupils varied in the rate at which each learned successive books of subject material. Thus, two pupils, Nos. 2 and 6, finished Book 1 in 17 days. However, to finish Book 2, pupil 2 required only 10 days, while pupil 6 required 14 days. Also, to finish Book 3, pupil 2 required 10 days, while pupil 6 required only 6 days. It is clear that although each pupil (Nos. 2 and 6) required the same number of days, 37, to finish the three books, they did not progress evenly.

¹⁰Ernest Horn, "Data on Ability Grouping from Iowa," *Twenty-fourth Yearbook of the National Society for the Study of Education*, Part II, p. 162. Bloomington, Illinois: Public School Publishing Company, 1925. (Quoted with the permission of the editor.)

The fact that pupils do not progress at equal rates must be clearly recognized by every teacher. Adequate provision must be made to meet such individual differences. This can be done by individualizing the learning activities to meet the variations in progress and understanding of each pupil.

4. *English literature.* Irion in a study of literary comprehension among 170 high school pupils of grade IX found very great individual differences in comprehension. The study was based on four test forms, each consisting of five parts. Form A was built upon a selection from Cooper's *The Spy*, Chapter 5. Form B was built upon Byron's poem *The Destruction of Sennacherib*. Form C was built upon Act 1, Scene 3 of Shakespeare's *Julius Caesar*. Form D was built upon Darwin's *Origin of the Species*, Chapter 1. Each form consisted of five tests, a total of twenty tests. In each form, Test 1 was to reveal the pupil's reading comprehension; Test 2 was to determine the pupil's ability to get specific facts from the printed page; Test 3 was to test interpretation of unusual expressions found in the selections; Test 4 was to test the pupil's knowledge of words in the selection; and Test 5 was to test the pupil's general information. The total score on the twenty tests was called the total literary comprehension score of the pupil. The individual differences in comprehension, as revealed by the tests, are shown in Table VIII.

Irion commenting on the existence of the individual differences in understanding says: "There seems to be no way of escaping the impressive fact of individual differences in literary comprehension."¹¹

¹¹Theo. W. H. Irion, *Comprehension Difficulties of Ninth Grade Students in the Study of Literature*, p. 76. Teachers College Contribution to Education, No. 189. New York: Teachers College, Columbia University, 1925. (Quoted with permission of the publisher.)

The scores shown in Table VIII give evidence from which one may infer that some of these ninth-grade pupils had

TABLE VIII.—DISTRIBUTION OF 170 PUPILS, GRADE IX, IN TOTAL LITERARY COMPREHENSION SCORE¹²

SCORE	PUPILS	SCORE	PUPILS
80—85	0	40—45	24
75—80	3	35—40	22
70—75	5	30—35	9
65—70	10	25—30	3
60—65	13	20—25	1
55—60	24	15—20	1
50—55	26	10—15	0
45—50	29		

progressed along the line of a learning curve at least five times as far as other members of the class.

5. *Vocabulary.* Table IX shows the percentage distribution of scores on the Detroit Group Vocabulary Test by the pupils of the X, Y, and Z sections of grades IB to IIB. These scores show wide range of achievement within each section and much overlapping among the sections.

TABLE IX.—DISTRIBUTION OF SCORES ON GROUP VOCABULARY TEST.
(BASED ON SCORES OF 1050 PUPILS IN 42 SCHOOLS)¹³

SCORE	I-B			I-A			2-B		
	X	Y	Z	X	Y	Z	X	Y	Z
30	22	8		44	16	3	54	29	14
25	25	12	2	26	17	4	28	12	15
20	18	23	3	13	17	15	13	19	19
15	15	17	12	8	17	23	4	18	17
10	10	18	26	5	4	25	1	13	11
5	10	16	33	2	15	18		8	15
0		6	24	2	4	12		1	9
Medians	24.1	17.9	8.9	28.3	20.3	14.0	30.6	24.7	19.4

¹²*Ibid.*, p. 38.

¹³Stuart A. Courtis, "Data on Ability Grouping from Detroit," *Twenty-fourth Yearbook of the National Society for the Study of Education*, Part II, p. 142. Bloomington, Illinois: Public School Publishing Company, 1925. (Quoted with permission of the editor.)

Table IX is to be read as follows: in the IB grade, group X, 22 per cent of the pupils made a score from 30 to 34; 25 per cent made a score from 25 to 29. Ability grouping, while a step forward, does not solve the problem of meeting individual differences in vocabulary.

Evidence such as shown in Table IX leads one to infer that these 1050 pupils will show marked differences in interpreting and understanding the same assignment. There

TABLE X.—DISTRIBUTION OF NUMBER AND TYPES OF BOOKS READ AS LEISURE-TIME READING BY 61 PUPILS OF GRADES VI AND VII, DURING THE THREE MONTHS, JANUARY TO MARCH, 1927¹⁴

BOYS IN GRADE VI*	NUMBER AND TYPES OF BOOKS READ							TOTAL
	ANIMAL	FABLE	FAIRY	FICTION	HISTORY	SCIENCE	MISC.	
1	0	0	0	0	18	28	0	46
2	7	0	4	0	0	20	10	41
3	3	14	1	2	3	5	2	30
4	6	2	0	0	2	19	0	29
5	2	3	2	1	6	14	1	29
6	2	2	0	0	8	16	0	28
7	7	5	0	4	1	6	0	23
8	3	3	0	3	2	9	2	22
9	2	6	2	4	2	2	0	18
10	1	0	5	0	5	2	1	14
11	5	1	2	3	2	1	0	14
12	1	1	1	0	10	0	0	13
13	3	2	1	0	2	3	0	11
14	0	1	0	1	1	6	0	9
15	3	0	0	0	0	4	0	7
16	3	0	0	0	0	4	0	7
17	2	1	0	0	0	1	0	4
18	4	0	0	0	0	0	0	4
19	0	2	0	1	0	0	0	3
Total	54	43	18	19	62	140	16	352

*The numbers in column one represent individual pupils in grade VI and grade VII. For example, No. 25 designates pupil No. 25, a girl in grade VI, and No. 48 designates pupil No. 48, a boy in grade VII.

¹⁴The author is indebted to Miss Jessie Robinson, teacher in the Brownsville, Pennsylvania, schools for the data used in this table.

PROGRESSIVE PRACTICES

TABLE X.—(Continued)

GIRLS IN GRADE VI*	NUMBER AND TYPES OF BOOKS READ							
	ANIMAL	FABLE	FAIRY	FICTION	HISTORY	SCIENCE	MISC.	TOTAL
20	1	0	1	70	0	0	0	72
21	3	0	0	54	1	9	0	67
22	7	4	0	20	0	0	10	41
23	1	0	2	37	0	0	0	40
24	2	2	2	17	11	1	0	35
25	7	2	7	7	2	0	2	27
26	4	4	6	3	1	9	0	27
27	3	1	6	5	3	5	3	26
28	0	0	2	15	1	2	0	20
29	1	3	5	2	2	1	4	18
30	0	4	0	8	3	3	0	18
31	0	1	2	4	0	0	8	15
32	3	5	3	2	2	0	0	15
33	4	2	0	5	0	1	3	15
34	1	0	3	2	3	5	0	14
35	2	2	3	1	1	0	0	9
Total	39	30	42	252	30	36	30	459
BOYS IN GRADE VII*	NUMBER AND TYPES OF BOOKS READ							
	ANIMAL	FABLE	FAIRY	FICTION	HISTORY	SCIENCE	MISC.	TOTAL
36	0	1	0	58	3	3	6	71
37	0	2	0	42	3	1	10	58
38	1	2	1	45	5	2	1	57
39	1	1	0	33	7	4	0	46
40	1	2	0	34	4	4	0	45
41	0	3	0	20	3	5	0	31
42	0	4	0	9	0	8	0	21
43	0	0	0	12	7	1	0	20
44	0	0	1	10	1	4	4	20
45	0	3	0	13	1	1	1	19
46	0	0	0	10	3	1	0	14
47	0	0	0	4	4	2	0	10
48	0	0	0	7	1	1	0	9
49	1	1	0	4	1	0	0	7
Total	4	19	2	301	43	37	22	428

*The numbers in column one represent individual pupils in grade VI and grade VII. For example, No. 25 designates pupil No. 25, a girl in grade VI, and No. 48 designates pupil No. 48, a boy in grade VII.

TABLE X.—(Continued)

GIRLS IN GRADE VII*	NUMBER AND TYPES OF BOOKS READ							
	ANIMAL	FABLE	FAIRY	FICTION	HISTORY	SCIENCE	MISC.	TOTAL
50	1	0	0	69	2	2	2	76
51	0	2	1	53	3	3	0	62
52	10	3	2	20	5	5	5	50
53	0	8	1	20	13	2	0	44
54	0	4	1	25	3	0	5	38
55	1	1	0	16	1	1	2	22
56	0	1	1	18	0	0	0	20
57	0	1	0	16	1	2	0	20
58	2	3	0	7	4	0	1	17
59	0	3	0	9	3	1	0	16
60	1	0	0	7	0	1	1	10
61	0	0	3	5	0	0	0	8
Total	15	26	9	265	35	17	16	383

*The numbers in column one represent individual pupils in grade VI and grade VII. For example, No. 25 designates pupil No. 25, a girl in grade VI, and No. 48 designates pupil No. 48, a boy in grade VII.

seems to the writer to be only one interpretation of such a situation: there must be individualization of the learning activities to meet more nearly the individual needs of each pupil.

c. Individual differences in personal acceptance of worth and value. *Leisure-time reading.* The great extent of individual differences in leisure-time reading is shown in the study reported below. A record was kept by Miss Jessie Robinson, teacher in the schools of Brownsville, Pennsylvania, of the number and nature of books read during the leisure time of her pupils. The record extended over a period of three months, January to March, inclusive, 1927. The record included the free-time reading of sixty-one pupils, thirty-three boys and twenty-eight girls, grades VI and VII. The record is summarized in Table X.

Table X shows that pupil No. 20, a girl in grade VI, read a total of 72 books, while pupil No. 19, a boy in the same

class, read only a total of 3 books. Pupil No. 50, a girl in grade VII, read a total of 76 books, while pupil No. 49, a boy in the same class, read only a total of 7 books.

Such a situation is probably typical of most sixth and seventh grades even among highly selected pupils. To encourage library reading will only increase the present wide range of books read. Yet that is the only wise thing to do for uniformity of library reading is as undesirable as it is impossible. Opportunity should be provided for extensive library work in every school; for that, in the end, is the best way to meet the individual differences in library reading as they now exist.

Summary. Each pupil should be thought of individually as being somewhere along the line of a progress curve. The results from a test merely indicate the level of development to which each pupil has progressed at the time of the test. The test scores are evidence from which there may be inferred the individual progress that each pupil has made toward attainment of certain learning products. Such differences in progress do exist and must be recognized and understood by the teacher. In order to meet the wide variations of pupils in their progress toward attainment of the ability to do, understanding, and the personal acceptance of worth and value the learning activities must be individualized to meet the individual needs of each pupil. This becomes, then, one of the practices in the Learning-Product Technique: to recognize individual differences in the progress of pupils toward attainment of the learning product.

SUGGESTIONS AND STUDY HELPS

1. Look for individual differences in one of your classes.
2. List the differences under the following headings: (a) height; (b) weight; (c) chronological age; (d) mental age; (e) intelligence quotient; (f) class marks.

3. Make a tabular distribution of the pupils in one of your classes showing the distribution according to the foregoing headings. (See Table VIII.)

4. Study the effects of individual differences as revealed in the progress of the pupils in one of your classes.

5. Show (by means of a table similar to Table III or IV) the effect of individual differences in progress of pupils.

6. Study the effect of individual differences as revealed in the final achievement of pupils in one of your classes.

7. Show, in tabular form similar to Table VII, the effects of individual differences on final attainment of pupils.

8. After a study of individual differences (as suggested in Nos. 1 to 7 above) at what conclusions do you arrive as to methods for meeting individual differences?

HELPFUL REFERENCES

DOUGLASS, H. R., *Modern Methods in High School Teaching*, Ch. XV. Boston: Houghton Mifflin Company, 1926

KOOS, L. V., *The Junior High School*, p. 36-51. Boston: Ginn and Company, 1927

MONROE, W. S., *Directing Learning in the High School*, Ch. XII. New York: Doubleday, Page and Company, 1927

TERMAN, LEWIS M., *The Intelligence of School Children*, Ch. IV-VI. New York: Houghton Mifflin Company, 1919

THORNDIKE, E. L., *Educational Psychology*, Vol. III. New York: Teachers College, Columbia University, 1925

The Twenty-fourth Yearbook of the National Society for the Study of Education, Part II. Bloomington, Illinois: Public School Publishing Company, 1925

V

INDIVIDUALIZING THE LEARNING ACTIVITIES

Value of individualizing the learning activities. Any learning activity is more effective when individualized to meet the needs and interests of each pupil. Valuable time is wasted by requiring a pupil to do a given piece of work regardless of his need for engaging in that activity. Controlled experiments have proved the value of individualizing the learning activities to meet the needs of the pupils. A few of these experiments are presented below.

a. Reading, grade IV. Gray reports the results from individualizing the learning activities in reading. Forty-three pupils of grade IV were given the Monroe Silent Reading Test, Form I. This test showed there were seven pupils who were at standard, or above, for their grade; 22 pupils who were one year below the standard for their grade; and 14 pupils who were two or more years below the standard for their grade. The learning activities were then individualized to meet the individual needs of each pupil. The reading activities for the better readers were based on narrative readings in history, hygiene, and geography. The poorer readers used supplementary stories of first-grade and second-grade difficulty with extensive drill in word analysis, phonetics, and flash card exercises. At the end of ten weeks the Monroe Silent Reading Test, Form I, again was given. Definite improvement was shown by 37 of the 43 pupils. This improvement is shown in Table XI.

The slow readers were reduced from 14 to 4 pupils, a reduction of over 71 per cent. The average readers were reduced from 22 to 14 pupils, a reduction of 36.4 per cent. The good

TABLE XI.—PROGRESS OF 43 PUPILS, GRADE IV, WHO HAD THE LEARNING ACTIVITIES INDIVIDUALIZED TO MEET THE INDIVIDUAL NEEDS OF THE PUPILS¹

TYPE OF READER	NUMBER OF PUPILS			PERCENTAGE GAIN OR REDUCTION
	AT BEGINNING	AFTER 10 WEEKS	AFTER 18 WEEKS	
Good	7	19	25	257.1 gain
Average	22	20	14	36.4 reduction
Poor	14	4	4	71.5 reduction

readers were increased from 7 to 25 pupils, an increase of approximately 257 per cent. This study shows that the plan of individualizing the learning activities to meet the needs of each pupil proved very effective.

b. Reading, grade IV. A similar experiment by Waldman also showed a gain resulting when the learning activities were individualized to meet the needs of each pupil. The class, composed of 43 pupils in grade IV, was given six informal tests in reading. The tests determined the rate of reading and the number of ideas retained. These tests showed the pupils to be rapid, medium, and slow in their rate of reading; and good, medium, and poor in their comprehension. The distribution of the pupils into these types of readers is shown in Table XII.

Ten pupils, Nos. 34 to 43, were selected for special training and study. The learning activities were individualized to meet the individual needs and difficulties of each of these ten pupils. The following were among the points stressed:

1. Creation of an interest in reading. To stimulate this desire, the pupils were worked with individually to determine their particular interests. This was accomplished by means of pictures that illustrated the stories read.

¹W. S. Gray, *Summary of Investigations Relating to Reading*, Supplementary Educational Monographs, No. 28, p. 108. Chicago: University of Chicago, 1925. (Data used with permission of the publisher.)

PROGRESSIVE PRACTICES

TABLE XII.—SCORES OF 43 PUPILS, GRADE IV, IN RATE AND COMPREHENSION OF READING²

	RAPID RATE			MEDIUM RATE			SLOW RATE		
	PUPIL	LINES	IDEAS	PUPIL	LINES	IDEAS	PUPIL	LINES	IDEAS
Compre- hension good	1	28.5	8.5						
	2	28.5	8.5						
	3	28.5	8.5						
Compre- hension medium	4	31.5	5.5	12	20.5	5	32	4.5	4.5
	5	24	6	13	19	5	33	4	4
	6	22	7	14	19.5	4.5			
	7	21.5	5	15	17	6			
	8	21	5	16	15	7			
	9	20	5	17	15	6			
				18	14.5	5			
				19	14	4.5			
				20	12	4			
				21	11.5	4			
				22	10	4			
				23	9.5	4			
				24	7	4.5			
Compre- hension poor	10	25	1	25	14	3	34	5	1.5
				26	14	2	35	5	1.5
	11	21	3	27	12	1.5	36	5.5	0
				28	10	3	37	5	3
				29	10	3	38	4	2.5
				30	10	3	39	4	2.5
				31	8	3	40	4	2.5
							41	.....	3
							42	.....	2
							43	.....	2

2. Frequent use of library books. Books were brought to the class; also the pupils were taken to the library and encouraged to use it.

3. Elimination of lip movements. Movement of lips while reading was shown to be useless and foolish.

²Bessie Waldman, "Definite Improvement of Reading Ability in a Fourth-Grade Class"; *Elementary School Journal*, 21 (December, 1920), 273. (Data used with permission of the publisher.)

4. Word grouping. The pupils were trained to find nouns and their qualifying adjectives, such as: "the naughty, disobedient prince."

The value of individualizing the learning activities to meet the individual needs of these ten pupils, slow in rate and poor in comprehension, is shown in Table XIII.

TABLE XIII.—GAIN MADE BY TEN PUPILS, POOR IN RATE AND SLOW IN COMPREHENSION OF READING, FROM NOVEMBER TO MAY, WHEN THE LEARNING ACTIVITIES WERE ADAPTED TO THE NEEDS OF EACH PUPIL³

PUPIL	LINES PER MINUTE			PUPIL	IDEAS RETAINED		
	NOV.	MAY	GAIN IN %		NOV.	MAY	GAIN IN %
34	5	11	120	34	1.5	6	300
35	5	10	100	35	1.5	2	33
36	5.5	11	100	36	0	2	...
37	5	8	60	37	3	6.5	117
38	4	7	75	38	2.5	6	140
39	4	20	400	39	2.5	7	180
40	4	6	50	40	2.5	2.5	0
41	..	19	..	41	3	7.5	150
42	..	24.5	..	42	2	5	150
43	..	5	..	43	2	2.5	25

In every instance the reading rate was increased from 50 to 400 per cent. With only one exception (pupil No. 40) the number of ideas retained was increased from 25 to 300 per cent. This study clearly shows the value of determining the individual difficulties and needs of the pupils and then individualizing the learning activities to meet those difficulties and needs.

c. English. In an experiment conducted by Shepherd in teaching English usage to junior high-school pupils the learning activities were individualized and three things emphasized:

³*Ibid.*, p. 280. (Data used with permission of the publisher.)

(1) the pupil's own need for the instruction given; (2) the pupil's personal responsibility for using, in all written work, the principles and facts learned in the English class; and (3) the examination of all written work for evidence of the need for special instruction in English. The method of individualizing the learning activities to meet the needs of each pupil is described by Shepherd as follows:

1. Individualized instruction: no pupil studied any lesson unless he could be shown his personal need for it.

2. The mistakes made by each pupil in his written work determined the lessons assigned to him.

3. Evidence of mastery was considered to be subsequent correct use in written work. Test results were considered chiefly a basis for justifying the instructor in holding the pupil responsible for correct usage.

4. A record of the lessons needed and of the lessons studied was kept by each pupil for himself and by the teacher for each pupil.

5. Papers from science and geography classes were used as the basis of many exercises in usage.

6. Written work from science and geography classes was known by the pupils to be the basis on which the instructor judged pupil need and pupil progress in usage. Such papers were generally to be found on the desk of the English instructor.

7. The pupils who wrote accurately—that is, with few mistakes in usage—had few lessons in usage to study and consequently were frequently allowed to spend the class hour reading in the classroom or in the library. Sometimes they were even permitted to use the tennis courts for the hour. These privileges were valued highly.

8. The pupils knew that their instructors in English, science, and geography conferred about their written work. They saw these instructors in conversation, saw papers exchanged between the departments, found science and geography papers almost constantly in the English room, and were informed of the results of the conferences. One science instructor sometimes sent pupils to the English teacher for help in correcting mistakes which the pupils could not find for themselves. Coöperation of departments was made obvious to the pupils.⁴ . . .

⁴Edith Shepherd, "An Experiment in Teaching English Usage to Junior High School Pupils," *School Review*, 33 (November, 1925), 676. (Quoted with permission of the publisher.)

Mimeographed material designed for the purpose was used. It included about sixty lessons, each planned to teach some principle of good usage frequently violated by pupils. Each lesson explained the principle involved and included a series of exercises requiring the application of the principle. Most of the lessons were simple enough to be studied from the text without help from the teacher. This was essential because of the highly individualized instruction. Theoretically, during a given period all pupils in a class might be studying different lessons. Generally, however, it was possible to gather together a group of pupils all of whom had the same lesson at the same time. For example, the first science paper showed that a majority of the pupils needed to give some attention to capitalization. They either capitalized "solar system," "sun," "moon," "star," "comet," and practically all important nouns or failed to capitalize such proper nouns as "Mars," "Saturn," etc. A few pupils, however, had not made mistakes in capitalization but had made mistakes of other kinds. To each of these last-named pupils the instructor assigned a lesson, the easiest lesson on his list.⁵ . . .

When a pupil had finished the exercises, learned the principle, and felt that he understood it, he was permitted to take a test to prove his understanding and to justify the instructor in holding him responsible for the correct usage in future work. If the test was not satisfactory, the points of difficulty were explained; further exercises were given; and a re-test was required.

Obviously, under this individualized procedure some pupils had many lessons to study, and some had few. The length and content of the course differed greatly for different individuals. In order that pupils who needed little study of usage might employ their class time profitably, a literature unit was presented early in the semester. Books were made available in the classroom and in the library; reading suggestions were offered; and topics for special study were suggested. Pupils took pleasure in being released from work in usage and allowed to read or work on some voluntary project.

Some pupils spent a large part of the English class period throughout the year on literature and general reading. No pupil spent all the class time on usage and composition. The entire class gave from one third to one half of the time to literature, reading discussions, etc.⁶

⁵*Ibid.*, p. 678. (Quoted with permission of the publisher.)

⁶*Ibid.*, p. 679. (Quoted with permission of the publisher.)

The gain resulting from individualizing the learning activities is seen in the progress of the pupils on three tests. The Starch Punctuation Test, Scale A, was one of the tests given. The results are shown in Table XIV.

TABLE XIV.—ATTAINMENT ON THE STARCH PUNCTUATION TEST, SCALE A, OF 65 PUPILS, GRADE VII, AFTER ONE YEAR OF INDIVIDUALIZED INSTRUCTION IN ENGLISH USAGE⁷

SCORE	NUMBER OF PUPILS	PERCENTAGE
Above grade XII	33	51
Above grade VIII	13	20
Standard grade VII	9	14
Below grade VII	10	15

The attainment of English usage was also measured by the University of Wisconsin Test of Grammatical Correctness. The results are shown in Table XV.

TABLE XV.—ATTAINMENT ON THE UNIVERSITY OF WISCONSIN TEST OF GRAMMATICAL CORRECTNESS OF 65 PUPILS, GRADE VII, AFTER ONE YEAR OF INDIVIDUALIZED INSTRUCTION IN ENGLISH USAGE⁸

SCORE	NUMBER OF PUPILS	PERCENTAGE
Standard for grade IX	33	51
Standard for grade VII	26	40
Below grade VII	6	9

A third test was given. This test has been used as an entrance test for those who enter the University High School of the University of Chicago. The test is for the purpose of testing ability to conform to standards of good usage in English. The results are shown in Table XVI.

This study in English by Shepherd, and the other two studies in reading, by Gray and Waldman, respectively,

⁷*Ibid.*, p. 684. (Data used with permission of the publisher.)

⁸*Ibid.*, p. 684. (Data used with permission of the publisher.)

TABLE XVI.—ATTAINMENT ON ENTRANCE TEST OF UNIVERSITY HIGH SCHOOL OF UNIVERSITY OF CHICAGO OF 65 PUPILS, GRADE VII, AFTER ONE YEAR OF INDIVIDUALIZED INSTRUCTION IN ENGLISH USAGE^a

SCORE	NUMBER OF PUPILS	PERCENTAGE
Ready to be excused from further study in English usage	44	68
Need individual instruction and further instruction	21	32

clearly show the value of individualizing the learning activities to meet the needs of each member of the class.

Basis for individualizing the learning activities. An important principle in teaching is: "Teach the pupil what he does not know." In order to do this the learning activities must be individualized to meet the needs and interests of each pupil. In the present chapter the exploratory test is stressed as the basis for individualizing the learning activities of the pupil.

The exploratory test. The exploratory test is given just preceding the presentation of the learning product. It is used, as its name implies, to explore the experiential background of the pupil and determine his needs as related to the learning product. Only when the needs of each pupil are determined can the learning activities be individualized and the pupil taught what he does not know. Individual differences are so great, individual backgrounds vary so widely, that intelligent direction of the learning activities must necessarily be based upon the disclosures of an exploratory test.

Because of differences in experiential backgrounds, the same learning activity may develop wholly different forms of ability to do, understanding, or personal acceptance of worth and value in different pupils. In order to prevent

^a*Ibid.*, p. 684. (Data used with permission of the publisher.)

this the teacher must ascertain the pupil's experiential background and then individualize the learning activity to suit the pupil's needs. If the pupil has an adequate background the new learning product can be connected to it; if the pupil does not have an appropriate experiential background then substitute experiences must be provided. A rich association of relationship between a pupil's experiences and the new learning product increases the ease of learning.

Frequently the exploratory test awakens the learning curiosity of the pupil and establishes a motive for attaining the learning product. This is an important principle in learning. No matter how valuable the learning product may be it can be developed as a new way of behaving only as there is created a desire to learn.

a. The value of the exploratory test. The value of using the exploratory test has been shown by Yoakam in his study of comprehension of prose by grade pupils. In this study, Yoakam divided 133 pupils of grades IV to VIII, inclusive, into two groups. Group A, consisting of 43 pupils, was given a written exploratory (initial) test based on "The Admiralty Islanders," an article of geographical material of about 1000 words. The pupils of group A were then allowed to read the article "The Admiralty Islanders" once and were then given an immediate test and also a delayed test after 20 days.

Group B, consisting of 90 pupils, was not given an exploratory (initial) test, but was allowed to read the article once and then was given the same immediate test and the same delayed test as were given group A.

The only difference in the procedures was that group A was given an exploratory (initial) test and group B was not. The results are shown in Table XVII.

It is clearly shown that the exploratory (initial) test had

TABLE XVII.—EFFECT OF EXPLORATORY TEST QUESTIONS ON COMPREHENSION OF READING PROSE. GROUP A WAS GIVEN THE EXPLORATORY TEST, GROUP B WAS NOT.¹⁰

GRADE	GROUP	IMMEDIATE TEST	DELAYED TEST 20 DAYS
IV	A	24.2	22.8
	B	17.0	16.1
V	A	30.5	23.5
	B	24.7	19.9
VI	A	39.3	31.7
	B	29.8	26.0
VII	A	48.2	43.1
	B	34.6	30.1
VIII	A	52.4	48.7
	B	37.8	32.5

the effect of directing the attention of the pupils of group A to facts that remained unnoticed by group B. It probably did this through the effect of motivation. The exploratory (initial) test aided, therefore, in facilitating the progress of group A toward attainment of the learning product.

b. The content of the exploratory test. The content of the exploratory test will necessarily vary according to the nature of the learning product, the age and maturity of the pupils, and the preference of the teacher. In all instances, however, the exploratory test must focus directly upon the learning product.

(1) If the learning product be one of ability to do then the content of the exploratory test should require performance of the activity that produces the ability to do. For example, if the learning product be ability "to spell twenty-five words"

¹⁰G. A. Yoakam, "The Effect of a Single Reading"; *Twentieth Yearbook of the National Society for the Study of Education*, Part II, p. 99. Bloomington, Illinois: Public School Publishing Company, 1921. (Data used with permission of the editor.)

then the exploratory test should require the pupil to spell these words. If the learning product be "ability to typewrite" then the pupil should be asked to typewrite. If the learning product be "ability to read" then the exploratory test should require the pupil to read.

In addition to performing the activity, the pupil should also perform certain separate parts of the activity. For example, if the learning product be "to divide" then one part of the exploratory test should consist of problems involving adding and carrying, multiplying, subtracting, and estimating the quotient, because these contributory abilities, secured as parts of other learning products, are now related directly to the learning product "to divide."

(2) If the learning product be one of "understanding" then the content of the exploratory test should consist of at least three parts, each part requiring the pupil to do a specific thing:

(a) To recall and use facts and experiences related to the learning product. For example, if the learning product be "to understand immigration" the pupil has many experiences, some organized, others unorganized, related to immigration. Some may be concerning the cause for immigration, the type of people, and their countries. Some of these experiences should be recalled and used in the exploratory test.

(b) To apply his knowledge of the vocabulary. The exploratory test should call for an application of the vocabulary, general as related to the unit of work, specific as related to the learning product to be attained.

(c) To meet novel situations and apply his understanding. For example, if the learning product be "to understand immigration," then the pupils should meet novel situations where he is required to apply his understanding. These situations should be situations of real life. If this is impossible,

then they should be as similar to life as possible. The pupil's reactions to these situations should give some evidence as to the presence of an understanding of the learning product.

(3) If the learning product be one of personal acceptance of worth and value then the exploratory test should provide situations where the pupil may indicate his preference, or may act as he thinks best. For example, if the learning product be "to recognize and accept books that are worth while" the exploratory test might ask the pupil to make a selection of books to be read as leisure-time reading. If the learning product be "to recognize and accept what is a good breakfast for a pupil in grade VI" the exploratory test might permit the pupil to indicate his preference for a certain type of breakfast.

c. Examples of exploratory tests. Examples of exploratory tests are given in the pages immediately following. These tests reveal the pupil's individual needs and thus serve as a basis to individualize the learning activities. In the examples that are given, the tests are focussed upon one of the three types of learning products—(1) ability to do, (2) understanding, and (3) personal acceptance of worth and value.

1. *Tests focussed upon the ability to do.* It is believed that presence of the learning product called "ability to do" can be inferred from evidence showing that the pupil is able to do the activity that makes up the learning product. That is, to determine if the pupil has attained the learning product called ability to spell, have him spell. To determine if the pupil has attained the learning product called ability to typewrite, have him typewrite. Two examples of exploratory tests focussed upon the learning product ability to do are presented—one test in spelling and one test in typewriting.

(a) *Spelling.* The manner in which an exploratory test may be given in spelling is illustrated by Morrison. The entire

TABLE XVIII.—RESULTS OF EXPLORATORY TEST IN SPELLING¹¹

PUPILS	WORDS																									TOTAL MISSES
	Almost	Ill	Sweeten	Subtraction	Blaze	Hump	Sign	Silent	Alley	Skipping	Strife	Below	Races	Barley	News	Bullet	Lime	Cinder	Case	Preach	Blot	Brass	Prairie	Tender	Team	
1.....	x			x			x				x			x									x	x		7
2.....					x					x				x				x					x		x	6
3.....			x				x																			2
4.....	x			x						x	x			x												5
5.....				x							x															2
6.....					x				x														x			3
7.....																										0
8.....				x																			x			2
9.....								x	x														x			3
10.....				x																x						2
11.....	x		x	x	x											x		x					x			7
12.....																										0
13.....																										0
14.....																										0
15.....												x		x												2
16.....								x			x											x	x			4
17.....														x									x			2
18.....																							x			1
19.....																							x			1
20.....				x																						1
21.....				x	x																		x			3
22.....											x															1
23.....																							x			1
24.....					x										x								x			3
25.....				x	x			x			x			x		x		x		x			x			9
26.....								x			x											x	x		x	5
27.....				x										x		x										3
28.....											x						x			x		x	x		x	6
29.....					x			x			x												x			4
30.....																x				x			x			3
31.....												x				x							x			3
32.....								x															x			2
Total.....	3	0	7	8	4	0	8	1	1	5	7	1	0	7	1	5	1	3	0	4	0	3	20	1	3	93

¹¹H. C. Morrison, *The Practice of Teaching in the Secondary School*, p. 515. Chicago: University of Chicago Press, 1926. (Used with permission of the publisher.)

list of words to be studied during the semester was divided into blocks of 25 words each. The first block consisted of the following words:

almost	hump	strife	bullet	blot
ill	sign	below	lime	brass
sweeten	silent	races	cinder	prairie
subtraction	alley	barley	case	tender
blaze	skipping	news	preach	team ¹²

These words were given as an exploratory test in which the teacher dictated each word and then used it in a sentence. For example, "There. There are thirty children in this room. There." The result of giving the test is shown in Table XVIII, which shows the words each pupil missed.

This exploratory test plainly shows the pupils who missed no words, and who, therefore, can probably be excused for other work. It also shows the pupils who need thorough drill and the words which they should study. Such an exploratory test becomes a very valuable aid in individualizing the learning activity to meet the needs of each pupil. The pupil activities involved in the spelling of these words can be individualized very easily. This is because the learning product is so definite: "to be able to spell correctly a given list of twenty-five words."

(b) *Typewriting*. An example of an exploratory test in typewriting is shown below.

OCTOBER TEST, 1927¹³

	Strokes
When a man is willing to own defeat, but straight-	50
way clenches his fist and grits his teeth and starts in to	109
remedy whatever defects there may be in his practice of	165
the sport in which he is engaged, the chances of his "com-	223

¹²*Ibid.*, p. 515. (Quoted with permission of the publisher.)

¹³Underwood Typewriter Company, October Test, 1927. New York: Underwood Typewriter Company. (Quoted with permission of the Underwood Typewriter Company.)

Strokes

ing back" become almost a certainty. Not to know defeat 280
 is the greatest misfortune that can befall a man. Every- 337
 body gets knocked down, metaphorically speaking, but 390
 he that grins and gets up ready to try it again with a 445
 better understanding, it may be, of the rules, is more than 505
 liable to come out a winner in the end. I have bunches 561
 all over me as reminders of the times and places where 616
 I have been hit, but I do not remember ever having gone 672
 behind the barn to cry about it. 706

I remember a lesson I got one day when a boy—or 755
 rather a bit of philosophy that took hold of and remained 813
 with me. I suppose many of you never saw a black- 863
 smith's shop, for they are like angels' visits these days 921
 and only found in some backwoods country. The old 972
 buildings are there now, but the sign has been changed 1027
 and now they have blossomed out as garages, and instead 1083
 of shoeing horses and fixing the iron tires on to buggies, 1142
 they mend radiators and are adepts in vulcanizing rub- 1196
 ber tires. And the entire atmosphere about them has 1249
 undergone a radical change. Instead of the odor of burn- 1306
 ing bone, as a hot shoe is applied to an animal's hoof, 1362
 there is an everlasting smell of gasoline and the floor is 1421
 slippery with motor oil. 1447

And the entire personnel of the place has changed. 1499
 In the old days the shop took the place of the Rotary 1553
 Club of today, especially when it rained and one could 1608
 not work in the hay field or weed his potato garden, and 1665
 there the news of the day, and the scandals of the com- 1720
 munity were discussed and sage verdicts rendered. The 1775
 owner of the shop was always a philosopher, or so it 1828
 seemed to me, and I never tired of listening to his quaint 1887
 epigrams, and being only a boy, and with little or no 1941
 work on my hands, I gravitated to the blacksmith's shop 1997
 at every opportunity. 2020

The particular smith whom I favored with my com- 2068
 pany had an assistant, or rather an apprentice, who was 2124
 "bound out" to him with the idea of learning the business 2182
 —and right here I will remark that under such a teacher 2239

Strokes

there was little doubt of the outcome. The boss had
 many things under his hat that could not be reached with
 a fine-toothed comb, and if I could spend a week with
 him now I think I could make fairly good literature out
 of him. However, as he passed away years ago, I am
 not certain where I would find him, but I am of the
 opinion that after he had told St. Peter one of his best
 yarns the gate would be opened wide for him.

On the day in question it rained, and the usual audi-
 ence was assembled at the shop. The smith was hard at
 work. The deacon had brought in his team of mules to
 be shod, and the apprentice was engaged in taking the
 harness off the beasts when a big horse fly got busy on
 the left hind leg of one of the mules. Naturally the mule
 elevated his leg, and naturally too, the apprentice landed
 out of the door and half way across the road. He picked
 himself up, not much the worse for his experience, and
 came back into the shop saying things under his breath
 about that mule that partook of libel, and rubbing the
 spot where he had been hit.

The smith looked him all over and finding that no
 damage had been done, took hold of the handle of his
 bellows and began to blow the fire. He kept at it until
 the forge was red and then turned to the apprentice and
 said: "Say Bill, look here—I cannot see what you are
 growling about. You want to get it through that thick
 skull of yours that what just happened is only a part of
 your education. You came here to learn to be a black-
 smith, and I will teach you—don't forget that—and here
 is a thing for you to remember—nobody ever amounted
 to anything in our business until after he had been half
 kicked to death by a jackass."

A homely story—yes—but it is as full of truth as an
 egg is full of meat. The memory of it has helped me
 many a time, and maybe you will do well not to forget it.
 The world is full of the kind of animal that kicked that
 apprentice, and unless you are superhuman you will
 undergo that experience in one way or another. Don't

	Strokes
growl about it—the chances are that you deserve all you	4328
get, and at any rate you can simply file it away in your	4385
memory as a part of your education. That is the same	4439
kind of philosophy that animates the people I spoke	4491
about at the beginning—those who get up, brush the dust	4548
off their clothes, and resolve to “come back.”	4594

(Start from the beginning if completed in less than fifteen minutes.)

This test in typewriting will disclose the pupil's speed, his accuracy, the types of his errors, and his needs.

2. *Exploratory tests focussed upon understanding.* It is believed that the presence of the learning product called “understanding” can be inferred from evidence showing that the pupil is able to meet and handle *novel situations* that require him to make application of his understanding. That is, to determine if the pupil has attained the learning product called understanding of English usage, have him meet novel situations where he is required to use certain forms of English. His understanding of English will be reflected in his reaction to the situation. To determine if the pupil has attained the learning product called understanding of country life, have him meet novel situations where he is required to make application of his understanding.

Two examples of exploratory tests focussed upon the learning product understanding are presented—one test in English usage and one test in nature study.

(a) *English usage.* The manner in which the exploratory test reveals the needs of each pupil is shown in the test in English given by Dunn. Story A of the Wilson Language Error Test was given to a sixth-grade class of 37 pupils. This test contains 28 of the most common errors in language, as shown by careful studies made in many parts of the country. Part of the test follows.

WILSON LANGUAGE ERROR TEST—STORY A
SATURDAY MORNING

Saturday morning is a busy time to are house. A feller has a good chance to work. Me and Dorothy divide the tasks between us. Then we race to see who will finish first. Last Saturday I taken the breakfast dishes as one of my tasks. I am especial fond of washing dishes. You should have saw me work. I wanted to get through so as I could play.¹⁴

The test papers were placed in the hands of the pupils and the errors made by each pupil were noted by him for further study. The teacher prepared a chart, similar to the one shown in Table XIX, showing the 28 errors, the names of the pupils, and a check mark under the name of each pupil and opposite each error made.

The test was followed by three months' study by the pupils of the errors they had made. The test papers were placed in the hands of the pupils so that each pupil knew his errors and also the correct forms. The learning activities then were individualized to meet the needs of each pupil as revealed by the test.

(b) *Nature study.* An interesting example of an exploratory test in the form of an oral quiz and discussion is related by Myra Kelly in her fascinating story of school life entitled *Little Citizens*. The teacher, Miss Bailey, had tried to interest her first-grade pupils with poems about nature, but they merely listened "in courteous but puzzled silence." Finally, after reading a poem about a lark and making vain efforts to get from the children some ideas of birds, the discussion proceeded as follows:

"Well," Morris began with renewed confidence, "I know what is a bird. My auntie she had one from long. She says like that, she should give it to me, but my mamma she says, 'No, birds is

¹⁴Wilson Language Error Test—Story A. Published by World Book Company, Yonkers-on-Hudson. (Quoted with permission of the publisher.)

TABLE XIX.—THE DISTRIBUTION OF LANGUAGE ERRORS MADE BY 37 PUPILS OF GRADE VI ON THE WILSON LANGUAGE ERROR TEST. THE NAMES OF THE PUPILS AND THE DISTRIBUTION AND TOTAL NUMBER OF ERRORS FOR EACH PUPIL ARE SHOWN.¹⁵

Story A	E. B.	G. B.	E. C.	L. C.	E. E.	A. F.	E. F.	G. F.	V. F.	R. G.	S. G.	R. G.	B. H.	R. H.	R. I.	A. K.	R. L.	H. M.	I. M.	L. N.	E. O.	B. O.	M. O.	F. P.	N. P.	E. P.	G. R.	R. R.	D. S.	J. S.	A. S.	C. S.	S. T.	E. W.	E. V.	E. Z.	Total		
to—at.....																																						5	
are—our.....	✓	✓			✓	✓	✓	✓		✓					✓	✓	✓	✓				✓	✓	✓													✓	19	
feller—fellow.....									✓							✓	✓	✓				✓	✓	✓													✓	32	
me—I.....	✓	✓			✓	✓	✓	✓								✓	✓	✓				✓	✓	✓													✓	8	
me and Dorothy.....																																						✓	13
taken—took.....	✓	✓			✓	✓	✓	✓								✓	✓	✓				✓	✓	✓													✓	7	
especial—especially	✓	✓			✓	✓	✓	✓																														✓	33
saw—seen.....									✓																													✓	3
as—that.....	✓	✓			✓	✓	✓	✓								✓	✓	✓				✓	✓	✓													✓	13	
John he.....	✓	✓			✓	✓	✓	✓																														✓	6
too—two.....	✓	✓			✓	✓	✓	✓																														✓	15
couldn't—could.....	✓	✓			✓	✓	✓	✓																														✓	23
did—done.....	✓	✓			✓	✓	✓	✓																														✓	19
sure—surely.....	✓	✓			✓	✓	✓	✓																														✓	36
real—really, very.....	✓	✓			✓	✓	✓	✓																														✓	33
ain't—haven't.....	✓	✓			✓	✓	✓	✓																														✓	4
got.....	✓	✓			✓	✓	✓	✓																														✓	12
ain't got no.....	✓	✓			✓	✓	✓	✓																														✓	11
comes—come.....	✓	✓			✓	✓	✓	✓																														✓	10
give—gave.....	✓	✓			✓	✓	✓	✓																														✓	9
to—too.....	✓	✓			✓	✓	✓	✓																														✓	30
was—were.....	✓	✓			✓	✓	✓	✓																														✓	53*
seen—saw.....	✓	✓			✓	✓	✓	✓																														✓	7
et—ate.....	✓	✓			✓	✓	✓	✓																														✓	6
them—the, those.....	✓	✓			✓	✓	✓	✓																														✓	5
no—any.....	✓	✓			✓	✓	✓	✓																														✓	25
hopes—hope.....	✓	✓			✓	✓	✓	✓																														✓	8
Total.....	13	10	12	8	10	14	12	14	8	15	16	11	14	7	11	14	17	11	11	7	8	15	20	17	7	12	11	15	13	8	15	14	6	17	13	9	10	44	5

*This error occurs twice, making possible a double score at this point.

¹⁵From Test Service Bulletin No. 10—Reducing Language Errors. Published by World Book Company, Yonkers-on-Hudson. (Quoted with permission of the publisher.)

foolishness.' But I know what is a bird. He scups on a stick in a cage."

"So he does," agreed Miss Bailey, rightly inferring from Morris's expressive pantomime that to "scup" was to swing. "But sometimes he flies up into the sky in the country, as I was reading to you. Were you ever in the country?"

"What country?" asked Morris. "Russia? I comes out of Russia."

"No, not Russia. Not any particular country. Just the open country where the flowers grow."

"No, ma'am, I ain't seen it," said the child gently. "But I was once to Tompkins Square. On'y it was winter und snow lays on it. I ain't seen no flowers."

"And do none of you know anything about the country?" asked Teacher sadly.

"Oh, yiss ma'am, I know," said Eva Gonorowsky. "The country is the Fresh Air Fund."

"Then you've been there," cried Miss Bailey. "Tell us about it, Eva."

"No ma'am, I ain't seen it," said Eva proudly. "I'm healthy. But a girl on my block she had a sickness und so she goes. She tells me all times how is the country. It's got grass stickin' right up out of it. Grass und flowers! No ma'am, I ain't never seen it: I don't know where is it even, but oh! it could to be awful pretty!"

"Yes, honey, it is," said Teacher. "Very, very pretty. When I was a little girl I lived in the country."

"All day?" asked Morris.

"Yes, all day."

"Und all night?"

"Yes, dear."

"Oh, poor Miss Bailey," crooned Eva. "It could to be a awful sickness what you had."

"No, I was very well. I lived in the country because my father had a house there, and I played all day in the garden."

"Weren't you scared of the lions?" asked Patrick in incredulous admiration.

"We had no lions," Miss Bailey explained apologetically. "But we had rabbits and guinea pigs and a horse and a cow and chickens and ducks and—and—"

"Und eleflints," Morris suggested hopefully.

"No, we had no elephants," Teacher was forced to admit. "But we had a turtle and a monkey."

"Did your papa have a organ?" asked Sadie Gonorowsky. "Organs mit monkeys is stylish for mans."

"Think shame how you says!" cried her cousin Eva reproachfully. "Teacher ain't no Ginney. Organs ain't for Sheenies. They ain't for Krishts even. They all, all for Ginneys."

"So's monkeys," said Sadie, unabashed. "Und organs mit monkeys *is* stylish."

The children's deep interest in the animal kingdom gave Miss Bailey the point of departure for which she had been seeking. She abandoned Wordsworth and Shelley, and she bought a rabbit and a pair of white mice. The first-reader class was enchanted. A canary in a gilded cage soon hung before the window and "scupped" most energetically while goldfish in their bowl swam lazily back and forth. From these living texts Miss Bailey easily preached care and kindness towards all creatures, and Room 18 came to be an energetic, though independent, branch of the S. P. C. A.¹⁶

3. *Test focussed upon the personal acceptance of worth and value.* It is believed that the presence of the learning product called "personal acceptance of worth and value" can be inferred from evidence which shows that the pupil does recognize and accept that which is worth while. This can be done by two methods: (a) by noting how the pupil behaves when he is free to select and act as he chooses; and (b) by having the pupil indicate his preference for, or his feeling toward, the learning product. That is, to determine if the pupil has attained the learning product called personal acceptance of worth and value in literature, have him make his own selection of books to be read as leisure-time reading.

One example of an exploratory test focussed upon this learning product is presented. The test was a test of be-

¹⁶Myra Kelly, *Little Citizens*, p. 327. New York: Doubleday, Page and Company, 1925. (Quoted with permission of the publisher.)

havior, that is, it showed how the pupil behaved when free to select as he desired. The test was one of leisure-time reading.

Leisure-time reading. A record was kept by Miss Jessie Robinson, teacher in the schools of Brownsville, Pennsylvania, of the number and nature of books read during the leisure time of her pupils. The record extended over a three-months' period, January to March, 1927, inclusive. The record included the free-time reading of sixty-one pupils, thirty-three boys and twenty-eight girls, grades VI and VII. The record is summarized in Table X.¹⁷

Such a record of leisure-time reading is a record of the pupils' life activities themselves. It is valuable because it shows each pupil's activities in reading when he was free to select for himself. As stated above, evidence of the personal acceptance of worth and value is the pupil's way of behaving when left free to his own devices. Such a record, therefore, of leisure-time reading as shown in Table X is a true exploratory test. As such it is a valuable aid to the teacher in individualizing the reading activities to meet the needs of each pupil after having determined the pupil's reading tastes and interests.

Methods of individualizing the learning activities. The individual needs of the various pupils arise not from inability to learn but from differences in their progress of learning. At any given moment every pupil has progressed to a certain level of development. This level of development may be high or it may be low along the rise of a learning curve. In either case the learning activities should be individualized to meet the needs of each pupil.

In every class, some pupils will be found who have progressed to a higher level of development than have other

¹⁷See Table X, pp. 85-87.

members of the class. The learning activities should be individualized for these pupils by giving them *enrichment* activities broadening in their nature and extending over a long learning period, one, two, or three months in length depending upon the maturity of the pupil.

(1) Paulu, in describing how the learning activities were individualized for those pupils who were above standard in third-grade reading, states that the daily work was enriched through special assignments in the library and in supplementary reading.¹⁸ (See page 234 of the present volume.)

(2) Bailey gives enrichment activities that were used in connection with the study of a unit in American history. The unit was called "Setting the stage for Columbus" and the enrichment activities for the pupils on the higher levels of development were in the form of library projects, as follows:

1. The China of Marco Polo
2. How the ancients measured the earth and proved it round
3. Medieval superstitions
4. Origin of banking
5. The commerce of the Italian cities
6. The Hanseatic League
7. The Fuggers
8. The Ottoman Turks
9. Prince Henry the Navigator
10. The first voyage of Columbus
11. The cities of the Renaissance
12. The sea-kings¹⁹

The two studies mentioned here, as well as that conducted by Shepherd (see page 93), illustrate how learning activities may be individualized to meet the interests and needs of the pupils who have progressed to higher levels of development than other members of the class. Methods for in-

¹⁸E. M. Paulu, *Diagnostic Testing and Remedial Teaching*, p. 232. New York: D. C. Heath and Company, 1924. (Used with permission of the publisher.)

¹⁹D. C. Bailey, *A New Approach to American History*, p. 14. Chicago: The University of Chicago Press, 1927. (Quoted with permission of the publisher.)

dividualizing the learning activities of the pupils who have not progressed to so high a level of development are presented in this chapter and Chapters XI and XII.

Summary. Valuable time is wasted when a pupil is required to do a given piece of work regardless of that pupil's individual needs and interests. In order to teach the pupil what he does not know the learning activities should be individualized to meet the pupil's needs. The basis for doing this is the exploratory test. This becomes, then, one of the practices in the Learning-Product Technique: to individualize the learning activities to meet the individual needs and interests of each pupil.

SUGGESTIONS AND STUDY HELPS

1. Why should the learning activities be individualized to meet the needs of the pupil?
2. What is the distinction between "individualizing" the learning activities and "individual" instruction?
3. How can you give an exploratory test in a subject that pupils are just beginning? For example, beginning reading, grade I, or beginning French, senior high school.
4. What would you do with a pupil who scored perfect on the exploratory test?
5. How can a teacher give an exploratory test in September or the beginning of a semester?
6. What will you do with the pupils while you are finding out their individual differences?
7. Should the learning products themselves be differentiated to meet the needs of each pupil?
8. Give an exploratory test and tabulate the scores as shown in the present chapter.

HELPFUL REFERENCES

- CHARTERS, W. W., *The Teaching of Ideals*. New York: The Macmillan Company, 1927
- DEWEY, JOHN, *How We Think*. Boston: D. C. Heath and Company, 1910

HALL-QUEST, A. L., *Supervised Study in the Elementary School*. New York: The Macmillan Company, 1924

MORRISON, H. C., *The Practice of Teaching in the Secondary School*. Chicago: University of Chicago Press, 1926

Twenty-fourth Yearbook of the National Society for the Study of Education, Part II. Bloomington, Illinois: Public School Publishing Company, 1925

VI

FOCUSSING THE ATTENTION OF THE PUPIL

The need for focussing the pupil's attention upon the learning product. The attention of the pupil should always be focussed upon the new learning product to be attained. This is because the nature of the response made in any learning activity is determined chiefly by the pupil's mental set. If the pupil has his attention focussed upon the learning product and how he is to attain it, the learning response becomes effective. If his mind is not centered upon what he is to do the response will be ineffective and unfavorable to economical learning.

An example of ineffective learning due to the pupil's attention not being centered upon the learning product is shown in an experiment by Thorndike. In this experiment a reading test consisting of the following paragraph was given to 200 pupils of grade VI.

In Franklin, attendance upon school is required of every school child between the ages of seven and fourteen on every day when school is in session unless the child is so ill as to be unable to go to school, or some person in his house is ill with a contagious disease, or the roads are impassable.¹

The pupils were then asked certain questions about the paragraph. The answers to the first question, "What is the general topic in this paragraph?" were as follows:

Franklin
In Franklin
Franklin attendance
Franklin School
Franklin attending school

¹E. L. Thorndike, "Reading as Reasoning: A Study of Mistakes in Paragraph Reading"; *Journal of Educational Psychology*, 8 (June, 1917), 323. (Quoted with permission of the author.)

Days of Franklin
School days of Franklin
Doings at Franklin
Pupils in Franklin
Franklin attends to his school
It is about a boy going to Franklin
It was a great inventor
Because it's a great invention
The attendance of the children
The attendance of Franklin
School
To tell about school
About school
What the school did when the boy was ill
What the child should take
If the child is ill
How old a child should be
If the child is sick of contagious disease
Illness
On diseases
Very ill
An excuse
The roads are impassable
Even rods are impossible
A few sentences
Made of complete sentences
A sentence that makes sense
A group of sentences making sense
A group of sentences
Subject and predicate
Subject
The sentence
A letter
Capital
A capital letter
To begin with a capital
The first word
A general topic
Good topic

Leave half an inch space
The heading
Period
An inch and a half
An inch and a half capital letter
The topic is civics
The answer²

Answers such as the above clearly show the need for focussing the pupil's attention upon the new learning product to be attained.

The value of focussing the attention of the pupil upon the learning product. When a pupil knows what is expected of him, he directs and controls his attention accordingly. Thus his learning is greatly facilitated. Exactly what is to be done and exactly what is to be gained in a learning activity should be made clear to the pupil. Few persons like to work blindly. Knowledge of the learning product and the advantage that is to come from possessing it are important factors in economical learning. Evidence of this is found in an experiment performed by Peterson.³ In this experiment a list of words was put on the blackboard and then copied by the members of the class. The students were not told what they were to do with the words or that a reproduction of them would be called for. An immediate reproduction of the words, however, was called for, and also another reproduction twenty-four hours later. Using a second list of words, the experiment was repeated with the same class. This time, however, the pupils were told that they would be asked for a reproduction of the words. On the second immediate reproduction test they did approximately fifteen per cent better than they did on the first test; on a delayed reproduction test, twenty-four hours later, they did approximately forty-

²*Ibid.*, p. 324. (Quoted with permission of the author.)

³Joseph Peterson, "The Effect of Attitude on Immediate and Delayed Reproduction"; *Journal of Educational Psychology*, 7 (November, 1916), 523. (Data used with permission of the author.)

eight per cent better than they had done on the delayed test of the first list. The entire experiment was then repeated with another class in exactly the same manner. The second group did thirty per cent better on an immediate test when they knew they were to be tested; and on a delayed reproduction test, twenty-four hours later, they did fifty-one per cent better than they had done on the delayed test of the first list. When the groups knew exactly what they were to do—that there would be a test—it facilitated their progress toward attainment of the learning product.

Methods of focussing the attention of the pupil upon the learning product. There are two methods that may be used to focus the attention of the pupil upon the learning product. These two methods are:

- a. Presentation of the learning product
- b. Use of directed-learning questions

Examples of these two methods are shown in the pages immediately following.

a. Presentation of the learning product. The presentation of the learning product is made by the teacher just as soon as she has explored the pupil's background of experience and determined his individual needs and difficulties. The chief purpose of the presentation is to convey to the pupil a clear understanding of the learning product. The teacher does this by developing in broad terms the main points concerning the learning product. The presentation is not a mere enumeration of things to be studied or done. As the name implies, it is a presentation of the learning product and the contributory processes needed to produce it. The number or kind of learning activities to be engaged in has no bearing on the presentation because its purpose is to develop an understanding of the learning product and not attainment of it. Such a

presentation necessarily involves not only an explanation of the learning product but a going back time and time again for further explanation on different points until there is a feeling that the pupil has caught the central idea involved in the learning product. In order to do this effectively, the presentation necessarily will vary for different learning products from a few simple remarks to very elaborate descriptions and explanations extending over one or more lesson periods.

Examples of presentations. There are several ways in which the learning products may be presented to the pupil. The method and length of the presentation will depend upon the nature of the learning products, the age of the pupil, the preference of the teacher, and the experiential background of the pupil.

Various examples are given below. These examples are grouped as follows:

Learning product to be attained:

(a) Ability to do. Presentation in:

Reading, grade I

Arithmetic, grade III

Arithmetic, intermediate grade

(b) Understanding. Presentation in:

Geography, intermediate grade

English, grade V

Science, junior high school

English literature, senior high school

(c) The personal acceptance of worth and value. Presentation in:

Art, grade VI

(a) *Ability to do.* (1) Reading, grade I. One teacher at Hallowe'en time presented the learning product *to be able to*

read "*The Brownie Unit*" to her pupils in first-grade reading. The story is as follows:

I am a little brownie.
I have a red cap.
I have a brown coat.
I hide in nuts.
I hide in flowers, too.
I like to skip and dance.
I like best to surprise boys and girls.⁴

The presentation is described by Pennell and Cusack as follows:

THE BROWNIE UNIT

The teacher at Hallowe'en time shows a picture of a brownie and says, "This little fellow is going to talk to you this morning. Would you like to know what he likes best to do? First, he will tell us who he is." The teacher writes on the board, "I am a little brownie." The children read it silently. If children seem to be having difficulty with the last word the teacher says, "Is there any word you do not know? Who is this? Then what would he say he is?" Individual children whisper the sentence to the teacher. Finally one child reads it aloud.

The teacher says, "The brownie tells us what he has." She writes on the board the second sentence. The children read silently and if necessary the teacher points to the red cap. She goes about letting the children whisper the sentence to her. Finally one child is asked to give it aloud.

The third sentence is developed in like manner. To present the next sentence the teacher says, "This is something the brownie does." The teacher writes, "I hide in nuts." She frames with her hands the first two words and says, "This part says, 'I hide.'" She then proceeds as with the former sentences.

In developing the fifth sentence the teacher holds the children responsible for knowing the phrase "I hide." The teacher points

⁴Mary E. Pennell and A. M. Cusack, *How to Teach Reading*, p. 175. Boston: Houghton Mifflin Company, 1924. (Used by permission of, and by arrangement with, Houghton Mifflin Company, the authorized publishers.)

to the word *too* and says, "This is my word." She tells what the word is. The following judgment questions may be asked, as, "Why does a brownie hide in nuts and flowers? Which place would you rather hide in?" Instead of having the children whisper what the sixth sentence says, she has the children show what the brownie likes to do.

The teacher writes the last sentence on the board and says, "This is what the brownie likes best to do." If some of the children are having difficulty with the word *surprise*, the teacher recalls what they are planning to do to Miss B's room.⁵

(2) Arithmetic, grade III. Presentation to a class of grade III pupils of the learning product *to be able to multiply and carry* is described by Morrison. In parts of the description, Morrison quotes the teacher and in other parts he describes the presentation as it appeared to him.

MULTIPLICATION

"If there are seven children in each of the five rows of seats in this room, you know how many there are in the room. There are 7 times 5 (writes) children in the room or 35 in all. Now perhaps there are 35 children in each of 8 rooms in this building and we should like to know how many there are in the building as a whole. There would be 35 times 8 (writes) children in the whole building, but you do not know yet how to multiply 35 by 8 and I am going to show you. We shall put 35 on the board and put the 8 under the 5 and draw a line in this way (illustrates). Now we say that 8 times 5 is forty. We put the 0 under the 5 and the 8 and save the 4 (writes). Next we say 8 times 3 is 24 and the 4 we saved makes 28. So we put down the 28 in front of the 0 (does it). And we see that there are 280 children in the building."

She works two or three others in this simple form and then takes a step in advance.

"The Roosevelt School is a big building which has 24 rooms and there are 32 children in each room. This is the way we find out how

⁵*Ibid.*, p. 176. (Used by permission of, and by arrangement with, Houghton Mifflin Company, the authorized publishers.)

many children there are in the Roosevelt School. We set down the 32 and under it we place the 24 like this (illustrates). Now we say 4 times 2 are 8 and put down the 8 under the 2 and the 4. Next we say 4 times 3 (points) are 12 and put down the 12 in front of the 8 (points). We say 2 times 2 (points) are 4 and we put down the 4 under the 2 in 24. Then we say 2 times 3 are 6 and we put the 6 down here in front of the 4 (points). Our work so far looks like this (illustrates). Now we draw a line and add 128 and 64 in this way (does it). Now we have 768. We call 128 and 64 the 'partial products' and 768 the 'whole product' or just the 'product'. So there are 768 children in the Roosevelt building."

The teacher works out two or three examples of each of the types which we have used, introducing in the second type factors which involve some carrying. She then proceeds to the heart of the matter with an example like 978 times 467, which she treats in the same manner, and works several more like it until she senses that the class has probably caught the idea.⁶

(3) Arithmetic, intermediate grade. In presenting the learning product *to divide one fraction by another fraction* the teacher used the following presentation with the pupils of an intermediate grade:

In learning to divide an integer by a fraction we have discovered that to divide by a fraction we multiply by its reciprocal. *Now to divide one fraction by another fraction* we shall simply follow the same procedure—multiply the first fraction by the reciprocal of the second. However, it seems best to begin with an example which can be illustrated easily in a concrete manner. Let us begin with the example, $\frac{3}{4} \div \frac{1}{8} =$.

Teacher: "How have we learned to divide by a fraction?"

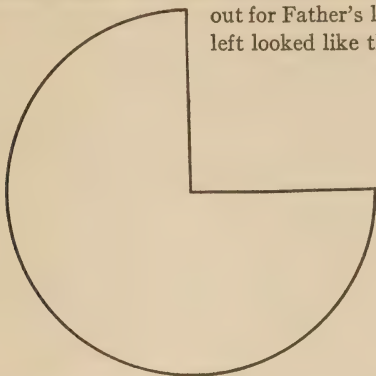
Pupil: "Multiply by its reciprocal."

Teacher: "Then our example becomes (writing)

$$\frac{3}{4} \div \frac{1}{8} = \frac{3}{4} \times \frac{8}{1} = \frac{6}{1} = 6.$$

⁶H. C. Morrison, *The Practice of Teaching in the Secondary School*, p. 243. Chicago: University of Chicago Press, 1926. (Quoted with permission of the publisher.)

Now let us see if 6 is right. Mother baked a pie and cut one fourth out for Father's lunch. What was left looked like this:



How many fourths were left?"

Pupil: "Three fourths."

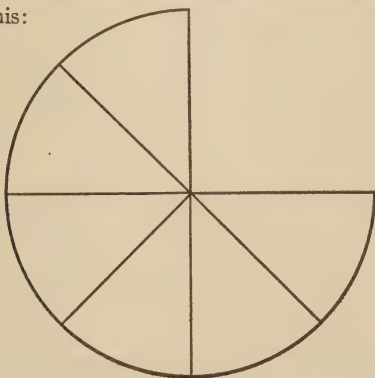
Teacher: "We can draw lines to show the three fourths. Now Mother said that she was going to cut the rest of the pie into eighths because it was so rich it would not be good for children to eat large pieces. Let us see how many eighths there were in one fourth."

Pupil: "Two eighths."

Teacher: "And how many eighths in the three fourths?"

Pupil: "Six eighths."

Teacher: "Then when Mother got through cutting the pie it looked like this:



So, when she divided $\frac{3}{4}$ of a pie into eighths, she got six pieces. Then, $\frac{3}{4} \div \frac{1}{8} = 6$. That is the answer we have already. So we know that to divide one fraction by another we multiply the first fraction by the reciprocal of the second.”⁷

(b) *Understanding.* (1) Geography, intermediate grade. In a geography class of intermediate-grade pupils the teacher presented the learning product *to understand the resources of Wyoming* as follows:

How many of you boys and girls saw the brilliant electrical display during the storm a few nights ago? Did you see any of the electric cables burning? Do you know what those wires are made of, and where it comes from?

Yes, copper from the mines.

This mineral is used in many of the wonderful inventions, in automobiles and airships, and in that way it played an important part in the late war. Someone has said, “Electricity has seized the world and copper is its handmaiden.”

In your lesson tomorrow write a list of the ways and places in which copper is used.

In some parts of the state tramways are used to transport the ore from the mines to the smelter. Who in the class will describe a tramway for us tomorrow?

Wyoming produces other products necessary in motor machines. What is it that makes the “wheels go round”? Oil and gasoline. Locate the large oil fields and learn the output per day from the state. Some of the railway trains of Wyoming use oil instead of coal for their motive power. In the City Hall the other day I saw a blue-print of a proposed pipe line for conveying oil from Wyoming to Omaha.

What is it that you find wrapped around the hot water pipes in the basement here at school to protect you from burning your hands as you thoughtlessly touch the pipes? Have you seen any raw asbestos? Wyoming claims to have one of the largest asbestos mines in the world. Other minerals are found in the state. Write a list of them.

⁷R. L. Morton, *Teaching Arithmetic in the Intermediate Grades*, p. 199. New York: Silver, Burdett and Company, 1927. (Quoted with permission of the publisher.)

Not all of the wealth of Wyoming is found under the surface. Some of it roams and feeds on the surface and produces great wealth to the owners. It is not an uncommon sight in shearing time to see great loads of bales of wool from the sheep, brought into the towns to the railway stations to be shipped away on trains run by oil. What other products would these trains carry? Wyoming, in shipping live stock to the Omaha packing companies, helps our city in business, and gives employment to many people.

Please bring into class tomorrow any samples you can procure of any products of the state. John will please arrange a personally conducted tour over Wyoming and appoint the various members of the class to lecture at the different stopping places about the products found there. Next week we shall take a pleasure trip through Yellowstone National Park.⁸

(2) English, grade V. The presentation of *an understanding of the Athenian oath* to the pupils of grade V was effectively made in the following manner:

The Athenian oath is written on the blackboard in full:

"We will never bring disgrace to this our city, by any act of dishonesty or cowardice, nor ever desert our suffering comrades in the ranks. We will fight for the ideals and sacred things of the city, both alone and with many. We will revere and obey the city's laws and do our best to incite a like respect and reverence in those above us, who are prone to annul or set them at naught. We will strive unceasingly to quicken the public's sense of civic duty. Thus, in all these ways we will transmit this city not only no less, but greater, better, and more beautiful than it was transmitted to us."

Teacher: Today we are going to learn the oath which the Athenian boy gave to his city. We all know who the Athenians were and how they trained their boys to become good citizens. One of the things they required of them was to recite the oath to their city. Although they lived many hundreds of years ago, we can still recite their oath if we want to show our loyalty to our city. So today we are going to spend our time learning it. First of all we shall read it over and see just what it says. (Have one of the class read from board.)

⁸A. L. Hall-Quest, *Supervised Study in the Elementary School*, p. 361. New York: The Macmillan Company, 1924. (Quoted with permission of the publisher.)

Teacher: Now let us all read it together. . . . Let us see just what this all means. First, as a whole, what do you think the oath means?

Pupils: It shows loyalty . . . it is patriotic . . . it shows what a boy will do for his city . . . etc.

Teacher: Let us now consider each sentence by itself. John, read the first sentence for us. . . . What does it mean? . . . What do we mean by cowardice? . . . By deserting our comrades in the ranks? Now let us read it over carefully to ourselves. . . . Who thinks he can recite it for us without looking at the board? . . . (Have several pupils do this.)

Teacher: Look at the second sentence. What does it say? Let us read this out loud together. What is it they are going to fight for?

Pupil: For the ideals and sacred things of the city.

Teacher: What are some of the sacred and ideal things of our city? Would you be willing to fight for them? What do we mean by "both alone and with many"? Who thinks he can recite this second sentence for us without looking at the board? . . . (Have several do this.) Who can recite both the first and the second sentences without looking at the board? . . . Let us see if we can all do it: let us repeat it together. (Do this several times, then have individuals do it until practically all have it memorized.)

Teacher: Now let us look at the third sentence, the longest one of them all. James, you read it for us. What do we mean by revere? In whom were they to incite a respect and reverence? What do we mean by "prone to annul"? What laws have we in our city which we should reverence and respect? Read it over carefully together. Repeat it again. Who is the first one to remember it? (Have five or six pupils recite it.) Who can give us all three sentences together?

Teacher: Now the next is a really short sentence, but a very important one. We all ought to get this one very soon. Let us read it together. What does it mean? What are some of our civic duties as young boys? Do you think we ought to strive to quicken the public's sense of civic duty? Who can recite this sentence for us? Who can give us all four of the sentences without looking at the board?

Teacher: And now we come to the last sentence of the oath. It tells us why the Athenian boy was going to do all these things.

Let us read it to ourselves and see if we can find out the reason. All right, Tom, you tell us why. Let us read it together. What do we mean by transmit? Do you think this is an aim worth having? Shall it be our aim? Read it together again. Who can give it without looking at the board? (Have five or six do this.) Now who can give us the whole thing?

(Erase oath from the board.)

Teacher: Now I am going to call on you to recite the oath and I want everyone else to listen and every time the one reciting makes a mistake hold up your hands.⁹

(3) Science, junior high school. A presentation in junior high-school science is shown below. The learning product presented was *to understand the sending of messages by electricity*.

The idea of using electricity for communication is old. You remember that one of the early discoveries in electricity was static electricity and you remember that if we take a pith ball, hang it to a string, and then bring a charged body close up to it, the ball is attracted over to the charged body. Now the earliest methods of communicating by electricity that we know of took place about the middle of the eighteenth century and what they tried to do was this: They got a long wire and around the wire they put insulation of some description. They would bring a charged amber rod over here (draws on the board) and over here (points) they would have a little ball. What would happen is that the current would flow through the wire and attract the pith ball to it. They had a wire for every letter of the alphabet. They would bring the amber up to a certain wire and the pith ball would fly over and say "This is A" and so on until a word had been spelled out. That was very slow.

Since that time we have had a great many better instruments for communicating by electricity. We have the telegraph, the telephone, the electric bell, the buzzer, the wireless telegraph, and the wireless telephone. Now every system of communication has four requirements.

The first requirement is a source of electricity. The source can be a cell, as in the case of an electric bell or a telegraph where the

⁹*Ibid.*, p. 194. (Quoted with permission of the publisher.)

message is sent a short distance and a powerful current is not needed. Or it may be a dynamo, if a powerful current is required, as in the case of the wireless.

The second requirement is a means of carrying the current. This means is a wire in the case of the telegraph or telephone or electric bell. In the case of the wireless it is the ether with which all space is filled. Waves are set up in the ether and these spread in all directions until some of them strike the aerial of the receiving station.

The third requirement for a system is a transmitter. The purpose of the transmitter is to complete the circuit and start the current going.

In an electrical bell, this is the bell (demonstrates); the cells here are the source of the current; here is the push-button. When I push down on the button, I release the electrons so that the current of electricity can go through this wire. The push-button acts as the transmitter and completes the circuit. In the telegraph system we have another device. This we call the "telegraph key" (demonstrates). The current comes from the cell, passes through the key and along the wire to this (demonstrates), which is called the "sounder." The telegraph key does the same as the push-button; it completes the circuit and when the current goes through the wire you get this (sound of a click). The clicks which come from the sounder are arranged into a code which is called the Morse alphabet. Each letter of the alphabet has a combination of clicks which stand for it and so a message can be spelled out.

In the telephone, the transmitter is really much the same but still somewhat different. The transmitter of a telephone is a moving diaphragm something like this (demonstrates). Waves of air are made by the source of sound such as the voice. You all know that sound itself is due to vibrations. I can illustrate that in this way. Here is a tuning fork. I can set it in vibration and you hear a sound. That is middle C. If you look closely, you can see the fork vibrating. Every note has its own peculiar number of vibrations and the sound of the voice is only a succession of notes which we learn to recognize as words. Now when one talks into the transmitter of a telephone (demonstrates) what actually happens is this: The vibrations set up by the voice strike the diaphragm here (demonstrates) and make it vibrate much as the tuning fork did, only it does not vibrate to one single pitch like middle C but rather copies all the many different

vibrations in our voices. Now the diaphragm is so connected electrically that it makes the current in the wire vary as the vibrations vary. So there are set up in this way a lot of electric waves which make a sort of electric current copy of the voice. You will find out later in detail just exactly how that takes place. The current passes through the receiver at the other end and makes that reproduce the vibrations just as they entered the transmitter and so we hear a sound just like what set the diaphragm to vibrating and that sound is the voice speaking.

In the wireless telegraph, we use an induction coil like this (demonstrates). You see I can make a spark. Now that spark sets up a certain kind of waves in the ether called "oscillations." It is something like this (illustrates). We can make the oscillations vary as we wish just as we could make the sounds with the telegraph key vary. So we can send a set of signals out into the ether just as we sent them along the wire with the telegraph key. Our aerial is so arranged that it will catch these oscillations and vary an electric current in such a way that we get a sound to match every sound which was started from the distant station where the spark was made.

The next requirement for sending messages by electricity is a receiver.

In the electric bell, the bell itself is the receiver. See this electro-magnet (demonstrates). When the current is sent through the wire and through the coils of the electro-magnet, the magnet attracts the clapper and the bell rings. When the push-button is released, the bell stops.

In the telegraph receiver you have the same thing. When the key is closed in the distant station, the current flows along the wire and through these electro-magnets. They become magnetic and this part (demonstrates) flies down and makes the sound (click). When the key is released, it is pulled back by the spring. So the receiver, you see, will make just the same sounds the key makes.

In the telephone receiver you have the same thing as in the bell and the telegraph sounder. Here is the electro-magnet and here the movable diaphragm. (Demonstrates with a dissected receiver.) The current flows through the coils of the magnet from the distant transmitter. You remember that the vibrating diaphragm in the transmitter makes the current vary in strength. When a strong im-

pulse comes through the magnet it attracts this diaphragm in the receiver strongly and a weak impulse attracts it weakly. So the diaphragm in the receiver copies exactly the vibrations in the diaphragm of the transmitter and this diaphragm in the receiver makes sound waves in the air which strike the ear just like the sound waves made by a voice in the same room and we hear what our friend who is speaking into the distant transmitter says.

The receiver for a wireless is too complicated for us now. Perhaps somebody will choose it some time for an extra project.

So there are four requirements for a system of electric communication:

First, there must be a source of current.

Second, you have to have some means of carrying the current.

Third, you must have a transmitter or some device for regulating the current strength.

Fourth, you must have a receiver and the receiver must be capable of changing electric waves into sound waves so that they affect the ear.¹⁰

(4) English literature, senior high school. One teacher used the following method to present to a high-school class the learning product *to understand how to formulate a plot*.

High school seniors were shown a *Saturday Evening Post* cover which represents a florid, middle-aged man in golf costume, with his bag, placing a sign "Gone on important business" on the door of his office. Through the partly closed door can be seen his desk all littered with papers upon which the wall-motto "Do it now" looks down with a wink. On the desk sets a vase of spring flowers. The pupils were asked who the man is, what his business is, whether he often leaves it, who will come to the door and read the sign while he is gone. By this time almost every pupil had a story plot formulated, and all were ready to accept the suggestion that they entertain each other with them. When asked how the matter could be managed best, they said, "Let us write. We can say it better." It was so ordered, with the understanding that each pupil should have the privilege of reading at least three of the papers. This

¹⁰H. C. Morrison, *The Practice of Teaching in the Secondary School*, p. 245. Chicago: University of Chicago Press, 1926. (Quoted with permission of the publisher.)

automatically provided an audience for each writer. Probability of action and consistency of character were recommended by the class as necessary to the highest success. Someone remembered that the use of dialogue brightens up a narrative. When the pupils were asked if they all knew how to put dialogue on paper a few confessed their uncertainty. Models were put on the board by some who thought they knew, and a satisfactory one approved. Then each was left to outline his story in more detail.¹¹

(c) *The personal acceptance of worth and value.* Art, grade VI. The method by which the learning product *to accept personally the worth and value of the theme of a picture* was presented to a sixth-grade class is shown below. The picture used was "The Gleaners."

At the beginning of the recitation, a good copy of the picture was brought before the class, but covered so that the pupils could not see what it was. Curiosity and interest were at once apparent. The teacher began by saying, "I have here a picture which I wish you to enjoy, but I fear that you are not ready to see it yet, because you are not prepared to appreciate it." By this time all distracting activities were forgotten, and everyone was eager to know why he was not considered ready to see this mysterious picture. The teacher continued, "The artist who painted this picture spent some time in a flat country which you might call uninteresting. He came to admire very much the peasant people who lived there, for their strength, their cheerfulness, their courage, and their contentment. If you were an artist and wished to show cheerfulness and industry at its best, what circumstances would you choose as a setting for your picture?" Under her questioning and direction of the discussion, the pupils agreed that such qualities appeared to best advantage in the midst of poverty and monotony. They recalled persons whom they had known and admired for cheerful industry under conditions which they felt would have been too discouraging for themselves. Some even suggested that the happiest persons they had known were poor. When the teacher finally asked, "Are you now ready to see how the artist showed these things?" it was a wholly sympathetic

¹¹L. V. Koos, *The Junior High School*, p. 391. Boston: Ginn and Company, 1927. (Quoted with permission of the publisher.)

class which leaned forward to share in the interpretation. Many recognized the picture at once, but as one pupil said, "It never meant anything to me before." The teacher allowed some minutes for the quiet enjoyment that was apparent, and for the spontaneous comments of pupils who pointed out details which they thought added to the effect. In response to a question, the teacher added some details regarding the painter and his other works, and suggested where more could be learned. The apparent feeling of the class was expressed by the closing remark of one pupil who said, "I know where there is another picture of his, and I'm going to see if that doesn't mean something too."¹²

b. Use of directed-learning questions. The use of questions as a teaching device should not be limited to teachers' tests or to the question-answer type of recitation. There should be a list of questions to direct and focus the pupil's learning activities upon the learning product.

The use of directed-learning questions should begin early in the lower grades. At first these questions should be short, simple questions based upon the learning products. Higher in the grades the questions should be accompanied with library references and suggested projects. By the end of the senior high school there should be a diminution of the questions, thus causing the pupil more and more to be dependent upon himself. In the lower grades a thought question for every sentence may be necessary. In the upper grades one question may be focussed upon a group of related sentences or paragraphs. Such a question should especially call for generalization and application of the principles involved in the learning product.

One purpose of the directed-learning questions is to cause the pupil to develop self-responsibility and the ability to work independently during the learning periods. The directed-learning questions, focussed upon the learning products, do

¹²F. W. Thomas, *Principles and Technique of Teaching*, p. 203. Boston: Houghton Mifflin Company, 1927. (Used by permission of, and by arrangement with, Houghton Mifflin Company, the authorized publishers.)

this by having the pupil perform acts of skill, observe and take notes, read, solve problems, give self-expression to a creative inner urge, or perceive a personal relationship between himself and the learning product to be attained.

(1) *The value of directed-learning questions.* The value of directed-learning questions has been shown by Alderman, who made an extensive study of the value of directing the pupil's learning by means of three types of exercises:

1. Vocabulary exercise.—To enlarge the child's reading and understanding vocabulary.
2. Organization exercise.—To train the child in selecting central paragraph thoughts and organizing them logically according to the writer's purpose.
3. Retention exercise.—To improve the child's ability in retaining and reproducing important thoughts which he had read.¹³

The study extended for one semester during which a total of 75 teachers, 72 classes, and 1933 pupils from grades IV to VIII participated.

At the beginning of the study, and also at the end, different forms of the Thorndike-McCall Reading Test were given. The results are shown in Table XX.

The effect of the directed-learning questions was that the pupils made an average gain of two semesters in comprehen-

TABLE XX.—NUMBER THAT GAINED, LOST, OR REMAINED THE SAME¹⁴

	TOTAL	GAINED	LOST	SAME
IV	410	349	37	24
V	421	310	77	34
VI	398	285	83	30
VII	402	275	109	18
VIII	302	190	96	16
Total	1933	1409	402	122

¹³G. H. Alderman, "Improving Comprehension Ability in Silent Reading"; *Journal of Educational Research*, 13 (January, 1926), 11. (Quoted with permission of the editor.)

¹⁴*Ibid.*, p. 19. (Quoted with permission of the editor.)

sion in reading. Out of the 1933 pupils, 1409 gained, 122 remained at the same reading level, and 402 lost in reading ability. Most of the 402 cases were among the brightest pupils—a fact which shows that a type of directed-learning questions which is helpful to a large group may not be suited to all members of that group. Such a fact emphasizes the existence of individual differences and the necessity of individualizing the learning activities to meet the individual needs of each pupil.

(2) *Examples of directed-learning questions.* There are various ways of organizing and presenting the directed-learning questions. Several examples of directed-learning questions are shown in the pages immediately following. These examples are focussed upon the learning product to be attained, that is, ability to do, understanding, and the personal acceptance of worth and value.

(a) *Ability to do.* (1) Reading, grade I. Pennell and Cusack give a list of directed-learning questions that was used to focus the pupil's attention upon the learning product *to be able to read "The Brownie Unit."* The story and presentation were given on pages 119-121 of the present volume.

The teacher now asks the children to:

1. Find the sentence that tells who is talking.
2. Show on the picture what this sentence says the brownie has.
3. Find another sentence that tells what the brownie has.
4. Find a sentence that tells where the brownie hides.
5. Read the two sentences that tell what the brownie likes to do.
6. Find all the sentences that tell what the brownie has. Have another child show on the picture what the different sentences said.
7. Do something a brownie likes to do. Have another child find the sentence that says what the child did.
8. Frame with their hands phrases in answer to questions, as:
Where does the brownie hide?
What does he say he is?

What does he say he has?

Whom does he like to surprise?

What does he say he does in nuts and flowers?

How many times can you find it? How many words can you find that begin with the sound *h*? The teacher gives the sound.¹⁵

(2) Reading, grade III. Anderson and Davidson give a list of directed-learning questions that was used to focus the pupil's attention upon the learning product *to read the story "Our First Gardeners."* The questions were as follows:

4. *Some helps to study.* (May appear on the blackboard.)
 - a. Look at the picture.
 - b. Read the story through quickly.
 - c. List any words that troubled you.
 - d. Read the questions at end of story. Think the answers. If you cannot answer the questions asked, reread that part of the story.
 - e. Check. Follow directions given. You should make a score of 50.
5. *Some things to do.* Do the first one. You may have your choice of *b* and *c*.
 - a. Write in your "Word Book" some phrases you will need in telling the story.
 - b. You may do one of the three things given below:

Draw a digging stick or a grain basket. Write three sentences about your picture.

List the phrases which tell what the Indian women did.

Write a story—How to Make Soup in a Wooden Kettle.
 - c. When your other work is finished, find one of the books given under "Other Selections" in the library and read more about the work of Indian women.

Some things to do at home: Make a carrying band; some corn meal from corn. Transplant some wild flowers to the home garden.¹⁶

¹⁵Mary E. Pennell and A. M. Cusack, *How to Teach Reading*, p. 177. Boston: Houghton Mifflin Company, 1924. (Used by permission of, and by arrangement with, Houghton Mifflin Company, the authorized publishers.)

¹⁶C. J. Anderson and Isobel Davidson, *Reading Objectives*, p. 168. New York: Laurel Book Company, 1925. (Quoted with permission of the publisher.)

(b) *Understanding*. (1) Geography, grade VII. Reeder reports a list of directed-learning questions that he used in geography to focus the pupil's attention upon the learning product *to understand the industries of the green northlands of Europe*. The list given below is taken from a larger list.

Sections 406 to 413, pages 210 to 214 tell about the Green Northlands of Europe. Paragraph 406 tells you what the principal industries of this section are. Write them here.....

Why are these the industries of the Green Northlands? Read from section 406 through section 413 with that question in mind. Read these sections twice. Then see how many of the questions below you can answer. After you have answered all you can without looking at the book, take the book and find the answers to the other questions.

1. Write the names of the islands which lie between Scotland, Norway and Iceland.....
2. Underline the best reason why the land in this section is used chiefly for pasturage:
 1. There are many cattle and sheep there.
 2. The islands are covered with snow in winter.
 3. The islands are too wet to plow in the summer time.
3. Fill in the blank spaces:

Partly because of the fact that this region is not suited for agriculture, the chief industry of the people is.....
 (look at the picture on page 210)and.....
 are salted or dried and exported. The houses are made of
and have.....roofs.
4. Underline the best title for section 407.
 1. Summer tourists in northern waters.
 2. Why northern waters near Europe are warmer than those near North America.
 3. The Gulf Stream.
 4. Ocean currents of the Atlantic Ocean.
5. Cross out the wrong words:

Ocean currents make the lands we are studying [warmer, colder] than they otherwise would be.

The Gulf Stream flows from the Caribbean Sea and the Gulf of Mexico [northeast, northwest] across the [Atlantic, Pacific] Ocean.

This current has [twice, 10 times, 1800 times] as much water as the Mississippi River.

6. Mark a T before the sentence below if it is true and an F if it is false.

The ports on the eastern coast of Siberia are open longer than those on the western coast of Norway.

7. Fill in the spaces below with the words "water" or "earth." Be sure to put the right word in the right space.

.....heats more slowly than.....

.....cools more slowly than.....

.....is warmed to a greater depth than.....

.....holds its heat a shorter time than.....

8. Cross out the wrong words:

Iceland [is independent, belongs to Denmark].

Icelanders are [very intelligent, not very intelligent].

9. Would you think of the coast of Norway as a good place to farm? (Write "yes" or "no".).....

Are Norwegian fjords like the mouth of the Hudson River?.....

Underline chief industries of Norway: lumbering; cotton growing; rice growing; fishing; mining.

10. Mark true or false:

.....Norwegian ships carry only Norwegian products.

.....Water power will be an important factor in the future industrial development of Norway and Iceland.¹⁷

(2) History, grade III. Hall-Quest reports the use of directed-learning questions in history to focus the pupil's attention upon the learning product *to understand the first Dutch settlement in America*. A portion of the list is given below.

Problem I: How Did the Dutch First Gain a Foothold in America?

*Text 70-74; Bourne & Benton 60-61; Gordy 63-66; Woodburn & Moran 61-63; Coe 128-131.*¹⁸

¹⁷E. H. Reeder, *A Method of Directing Children's Study of Geography*. Teachers College Contribution to Education No. 193, p. 48. New York: Teachers College, Columbia University, 1925. (Quoted with permission of the publisher.)

¹⁸Refers to pages in reference reading.

Review: What events in Europe made it possible for the Dutch to colonize America? Bourne & Benton 238.

Assignment and Coöperative Study.

Problem II: How Did Henry Hudson Give Holland a Claim to America?

1. Who was Hudson? 71. Footnote 1.
2. How did he happen to be sailing for the Dutch? 70.
3. For what was he looking when he came to America? 70, Bourne & Benton 61.
4. When did he come to America? 70.
5. Why was Hudson's voyage important? (2 reasons) 71.
6. How much land did the Dutch claim as a result of his work? 71.

Problem III: How Did the Fur Trade Strengthen the Dutch Settlements in America?

1. What was the greatest extent of the Dutch claims in America? 71, 72. What name was given to these claims? Locate. Map 71.
2. What was the main attraction in America that led the Dutch to settle? 73.
3. What was the Dutch West India Company? When chartered? 72.
4. What powers was it given over the New Netherlands? 72.
5. What fur trading stations were established by the Dutch? 72, 73. Locate each. Map 71. What are the present names of these early settlements?
6. What have you found to be the one important motive that brought the Dutch to America?

Problem IV: Why Was the Establishment of the Patroon System Necessary for the Success of the Dutch Colonies? Fiske 131.

1. What was the leading occupation of the Dutch? 72.
2. Describe the Dutch settlements.
3. What was the patroon system? Who was a patroon? 72, 73; Bourne & Benton 61.
4. What was the position of the immigrant that came to America under this system? Bourne & Benton 61; Gordy 64, 65.
5. How did this system affect the settlements? Woodburn & Moran 63, 64.
6. What two things have we now found that attracted settlers?

7. Summary: In what respects were the early French and Dutch settlements alike?

Map Assignment: p. 71.

Subject: Dutch Settlements in America.

Locate: New Netherlands in yellow.

Delaware, Hudson, Connecticut rivers.

Ft. Nassau, Ft. Orange, New Amsterdam, Ft. of Good Hope.¹⁹

(3) History, senior high school. Bailey reports the use of directed-learning questions in American history to focus the pupil's attention upon the learning product *to understand how the stage was set for Columbus*. The questions were as follows:

1. What was the broad significance of the Renaissance? Base your discussion on the following points: (a) origin of the Renaissance, (b) its varied and significant accomplishments, (c) the relative importance of Columbus' exploit.

2. How did the ancient world contribute both positively and negatively to the work of Columbus?

3. What did the ancient world know about the size and shape of the earth? Why would the voyage of Columbus have been inevitably postponed if this knowledge had not been brought to light?

4. What theories did the ancient world hold regarding the distribution of land and water areas? Were these theories of any scientific value to Columbus? To what extent did the Renaissance contribute positive knowledge on these theories?

5. What did the Italians contribute that was of direct value to Columbus? Show exactly how these contributions aided Columbus.

6. How did Marco Polo specifically aid Columbus in the formulation of his idea?

7. How was the work of the Portuguese more directly related to the work of Columbus than that of the Italians?

8. How did the revival of trade with the Orient stimulate the growth of industry?

9. In what way did the expansion of commerce and industry revolutionize the business organization of Europe? Why?

¹⁹A. L. Hall-Quest, *Supervised Study in the Elementary School*, p. 387. New York: The Macmillan Company, 1924. (Quoted with permission of the publisher.)

10. How was the general stimulation of the economic life of Europe during the Renaissance related to the exploit of Columbus?

11. Discuss the significance of the outstanding qualities of the Renaissance mind in relation to the accomplishments of the age.

12. What part did the spirit of the age play in the life and work of Columbus?

13. Why was such a voyage as that of Columbus never made before?

14. Show how the four major parts of the unit are related to an understanding of the unit as a whole.²⁰

(c) *The personal acceptance of worth and value.* Reading, grade IV. Pennell and Cusack report the use of directed-learning questions in reading to focus the pupil's attention upon the learning product to *accept personally the worth and value of the theme in a poem.*

ROCK-A-BY, HUSH-A-BY, LITTLE PAPOOSE

(By CHARLES MYALL)

Rock-a-by, hush-a-by, little papoose,

The stars come into the sky,

The whip-po'-will's crying, the daylight is dying,

The river runs murmuring by.

The pine trees are slumbering, little papoose,

The squirrel has gone to his nest,

The robins are sleeping, the mother bird's keeping

The little ones warm with her breast.

The roebuck is dreaming, my little papoose,

His mate lies asleep at his side,

The breezes are pining, the moonbeams are shining

All over the prairie wide.

Then, hush-a-by, rock-a-by, little papoose,

You sail on the river of dreams;

Dear Manitou loves you and watches above you

Till time when the morning light gleams.

²⁰D. C. Bailey, *A New Approach to American History*, p. 13. Chicago: University of Chicago Press, 1927. (Quoted with permission of the publisher.)

What did the Indian mother sing about? Why did she sing about these things? What does the first stanza tell about? (Twilight.) Read the reasons that make *you* think so. Why would the papoose hear a whip-po'-will? What word has a sleepy sound?

What do the second and third stanzas tell about? (All the little things have gone to sleep.) Read the reasons the Indian mother gives for the papoose going to sleep. Are there any especially good words used in these stanzas?

What does the last stanza tell? (The baby will be safe.) Why does the Indian mother say the baby will be safe? What does it mean to sail on the river of dreams? Who is Manitou? Read what Manitou will do. Why do you think the papoose should sleep well during the night?

Close your eyes and try to see the different pictures as I read the poem. How does the poem make you feel? Why? What part of the poem do you like best? What kind of a voice did the Indian mother use? Read the part you like best.²¹

Summary. The attention of the pupil should always be focussed upon the learning product. This may be done by means of the presentation lesson and the directed-learning questions. This becomes, then, one of the practices of the Learning-Product Technique: to focus the attention of the pupil upon the learning product to be attained.

SUGGESTIONS AND STUDY HELPS

1. What distinction is there between the "presentation" lesson and the usual type of assignment?
2. Why should the presentation lesson be an explanation, not of the learning material, but of the learning product?
3. Prepare a presentation lesson for a learning product.
4. Give the presentation as prepared and watch the reactions of the pupils.
5. How can you give pupils directed-learning questions when the school has no facilities for multigraphing the questions?
6. Should the directed-learning questions direct the pupil's think-

²¹Mary E. Pennell and A. M. Cusack, *How to Teach Reading*, p. 255. Boston: Houghton Mifflin Company, 1924. (Used by permission of, and by arrangement with, Houghton Mifflin Company, the authorized publishers.)

ing? If so, how can you provide for independent thinking and the building of attitudes of preference?

7. Prepare directed-learning questions based upon a learning product you expect to teach.

8. Use the directed-learning questions as prepared and study the pupils' reactions and the effect of the questions upon the pupils' scores.

HELPFUL REFERENCES

DEWEY, EVELYN, *The Dalton Laboratory Plan*. New York: E. P. Dutton Company, 1922

HALL-QUEST, A. L., *Supervised Study in the Elementary School*. New York: The Macmillan Company, 1924

KOOS, L. V., *The Junior High School*, Ch. X. Boston: Ginn and Company, 1927

MORRISON, H. C., *The Practice of Teaching in the Secondary School*, Ch. XIV-XVII. Chicago: University of Chicago Press, 1926

STORMZAND, M. J., *Progressive Methods of Teaching*, Ch. XIV. Boston: Houghton Mifflin Company, 1924

THOMAS, F. W., *Principles and Technique of Teaching*, Ch. XII-XIV. Boston: Houghton Mifflin Company, 1927

VII

INCREASING THE EASE OF LEARNING

Increasing the ease of learning. As the teacher guides the pupil toward attainment of the learning product there are certain techniques she may use to facilitate ease of learning. Among these is the use of association. Reed says:

The law of association may be stated in various ways: that the ease of learning is increased by making the material meaningful; or that the ease of learning is increased by the observation of relationships in the material to be learned; or that a response to a situation is strengthened by increasing the number of connections between them; or that the ease of learning something is increased by relating it to the child's experiences and activities; or that the new is learned by means of the old.¹

a. Ease of learning is increased by transforming the meaning of the material. If the teacher can transform or enlarge the meaning of the material the ease of learning for the pupil will be increased. This is shown in a series of experiments conducted by Reed.

1. *Sentences and disconnected words.* In one experiment Reed read 12 series of disconnected words, each series varying in length from 4 to 18 words. Each series was read once and as soon as it was read the students wrote down all the words of the series they could remember. A series of 12 sentences each sentence varying in length from 8 to 34 words was also read. Again as soon as each sentence was read the students wrote down all the words they could remember. The results are shown in Table XXI.

It is seen that the number of words remembered was four times as great for *words in sentences* as for disconnected words.

¹Homer B. Reed, *Psychology of Elementary School Subjects*, p. 13. Boston: Ginn and Company, 1927. (Quoted with permission of the author.)

TABLE XXI.—NUMBER OF DISCONNECTED WORDS AND WORDS IN SENTENCES REMEMBERED BY 189 STUDENTS²

NUMBER OF STUDENTS	AVERAGE NUMBER OF DISCONNECTED WORDS REPRODUCED	AVERAGE NUMBER OF WORDS IN SENTENCES REPRODUCED
189	6.5	25.3

The words, because they were in sentences, had their meanings transformed or enlarged for the pupil, therefore were easily learned. The disconnected words held little meaning for the pupil and, therefore, were more difficult to learn.

The increase of meaning with the words in the sentences increased by 300 per cent the amount of material that could be learned at one time. Ease of learning, therefore, is greatly facilitated through increasing the meaning of the material.

2. *Poetry and digits.* In another experiment, Reed required a class to memorize a row of 30 digits and also a stanza of poetry containing 30 words. The results are shown in Table XXII.

Other things being equal it should have taken as long to learn the poetry as to learn the digits. The increase of meaning in the words of poetry, however, increased the ease of learning by approximately 70 per cent.

TABLE XXII.—COMPARISON OF NUMBER OF DIGITS AND WORDS OF POETRY REMEMBERED BY 32 STUDENTS³

NUMBER OF STUDENTS	LEARNING TIME IN MINUTES	
	DIGITS	WORDS OF POETRY
32	5.5	1.7

²Homer B. Reed, "Repetition and Association in Learning"; *Pedagogical Seminary*, 31 (June, 1924), 148. (Data used with permission of the editor.)

³*Ibid.*, p. 149. (Data used with permission of the editor.)

3. *Prose.* In another experiment by Reed the entire story of "The Marble Statue," an easily understood prose story, was read to a group of students. After the reading they were asked immediately to write down all they could remember. For purposes of scoring, the story was divided into sixty-seven ideas. The same procedure was followed with a selection of equal length from a difficult prose essay, Hume's philosophical essay on "The Human Understanding." In both instances the students were asked to write down immediately as many ideas as they could remember. Two other unannounced tests were called for, one week and two weeks later, respectively. The results of the three tests are shown in Table XXIII.

TABLE XXIII.—NUMBER OF IDEAS REPRODUCED IMMEDIATELY, AFTER ONE WEEK, AND AFTER TWO WEEKS⁴

PROSE	NUMBER OF IDEAS REPRODUCED		
	IMMEDIATE REPRODUCTION	AFTER ONE WEEK	AFTER TWO WEEKS
The Marble Statue	49.0	56.0	39.5
The Human Understanding	11.5	3.7	4.0

The immediate reproduction was four times as great for the easy prose as for the difficult; fifteen times as great for the easy as the difficult after one week; and ten times as great for the easy as the difficult after two weeks. The presence of larger meaning with the easily understood prose greatly aided ease of learning and retention.

4. *Rate of forgetting.* Pyle reports the experimental work of Ebbinghaus, Radossawljewitsch, and Finkenbinder in determining the rate and extent of forgetting as related to meaningful material and nonsense syllables. The studies

⁴*Ibid.*, p. 149. (Data used with permission of the editor.)

made by these investigators show the value of increasing the meaning of the material. The results of the studies are shown in Table XXIV.

The differences in the results from these three experimenters are due to differences in technique, differences in method of presentation of the material, and differences in determining when the learning was completed. Some of the material used was meaningful, some was nonsense syllables.

TABLE XXIV.—AMOUNT OF MATERIAL FORGOTTEN AFTER LAPSE OF DIFFERENT INTERVALS OF TIME⁵

INTERVAL OF TIME	FINKEN- BINDER	RADOSSAWLJEWITSCH		EBBINGHAUS
	NONSENSE SYLLABLES AVERAGE	NONSENSE SYLLABLES AVERAGE	MEANINGFUL AVERAGE	AVERAGE
5 minutes	....	2.5	....	....
20 minutes	....	11.4	3.9	41.8
30 minutes	25.0	....	....	....
1 hour	27.2	29.3	21.7	55.8
2 hours	30.6	....	....	....
4 hours	33.6	....	....	....
8 hours	34.5	52.6	41.9	64.2
12 hours	36.2	....	....	....
16 hours	37.0	....	....	....
24 hours	42.2	31.1	20.3	66.3
36 hours	41.2	....	....	....
2 days	44.5	39.1	33.2	72.2
3 days	47.9	....	43.5	....
4 days	....	....	45.5	....
5 days	....	....	43.5	....
6 days	....	50.7	57.6	74.6
7 days	....	....	50.0	....
14 days	....	59.0	70.0	....
21 days	....	62.2	52.4	....
30 days	....	79.8	76.1	78.9
120 days	....	97.2	....	....

⁵W. H. Pyle, *The Psychology of Learning*, p. 134. Baltimore: Warwick and York, 1921. (Data selected and used with permission of the publisher.)

This made a difference in the amount forgotten. Different individuals were used. This fact also caused differences in the results.

Pyle commenting says:

The rate of forgetting is different with different materials, different methods, and for different individuals, but it is always very fast at first, then slower and slower. In Ebbinghaus' experiments, more than one-third of the syllables were forgotten in the first twenty minutes; more than one-half in one hour; nearly two-thirds in nine hours; more than two-thirds in twenty-four hours. In the experiments of Radossawljewitsch with meaningful material, one-third was forgotten within two days, while one-third of meaningless material was forgotten in one day; one-half of meaningful material was forgotten in seven days, while one-half of meaningless material was forgotten in six days. In thirty days three-fourths of the meaningful material was forgotten and four-fifths of the meaningless material.

Meaningful material is not forgotten as quickly as meaningless material, because it is not new material, and the learning of it has been going on perhaps for years, in some cases, all our lives. The learning of meaningful material means merely the re-arrangement of what we already know. If we undertake to commit to memory *Evangeline*, we read: "This is the forest primeval, the murmuring pines and the hemlocks," etc. Neither the words nor the thought is new. This fact makes the learning of meaningful material a wholly different matter from the learning of meaningless material.⁶

b. Ease of learning is increased by observing points of relationship between one experience and another. Learning is never single nor unassociated. When a pupil is learning one experience he is also associating it with other experiences previously acquired. Not only does he associate the experiences but he associates them in certain particular ways. For example, if two experiences are thought of as being similar, or as contrasted, or as sequent, they will be associated and

⁶*Ibid.*, p. 136. (Quoted with permission of the publisher.)

recalled in the same relationship. That is, each time they are recalled they will be thought of as being similar, or as contrasted, or as sequent.

The process of associating things is always going on in the mind of the pupil. These associations offer among themselves almost unlimited possibilities of relationship. For example, as one chances to walk through a park he may have experiences of a varied nature closely connected in time and space. He may listen to the songs of birds among the trees; may see water lilies floating upon the surfaces of ponds; or may walk along a winding creek and pick up rounded pebbles from its banks. Later as one tends to recall one of these experiences the others come trooping back in close succession because they were closely associated and related in time and space.

When two experiences are similar it is because they have a common element which establishes a relationship between them. That ease of learning is facilitated through observing this common element, this point of relationship, finds illustration in the recall to one's mind of a particular friend upon seeing someone who resembles the friend; in the similarity between a white cloth and snow because of the common element of whiteness; between the full moon and a balloon because of the common element of roundness. The presence of the common element may give rise also to contrast. One contrasts north with south because of the common element of position; circle with square because of the common element of shape; darkness brings to mind light because of the common element visibility; beauty suggests ugliness; peace suggests war; night, day; tall, short; and hot, cold. Association through observing points of similarity or relationship is a valuable aid and should be extensively used to facilitate ease of learning.

c. **Ease of learning is facilitated by increasing the number of attentive repetitions of the learning activity.** After the initial performance of a learning activity the pupil should strengthen and perpetuate it through use. The more times the activity is attentively repeated the greater is the probability that its strength will increase. On the other hand the less a learning activity is engaged in, the greater is the probability that it will grow weak through disuse. The tendency for an activity to grow stronger by use and to grow weaker through disuse forms the basis for learning through repetition, or drill activities.

Repetition is necessary if the learning product, or new way of behaving, is to be made permanent. One does not learn what one does not practice. If it be an ability to do it must be practiced. So with an understanding, or the personal acceptance of worth and value. Whatever the learning product it must be practiced. The new way of behaving may be an inner response or it may be an outward movement. But whatever the change, the new way of behaving, if it is to be made permanent, must be practiced, must be repeated.

Reed⁷ reports an experiment which consisted of saying the alphabet backward twelve times in succession. One student required 60 seconds for the first trial, 35 for the second, 20 for the fourth, 18 for the eighth, and 17 for the twelfth, as shown below.

Trial number	1	2	4	8	12
Time in seconds	60	35	20	18	17

Reed rightly concluded that this experiment showed that repetition of the learning activity increased the ease of learning. It did this through decreasing the time required.

⁷Homer B. Reed, *Psychology of Elementary School Subjects*, p. 3. Boston: Ginn and Company, 1927. (Data used with permission of the author.)

The length of the repetition and the frequency of the repetition lie at the foundation of all drill. Other things being equal, those things are most quickly attained and the best remembered which are most often attentively repeated. Worth-while experiments as to the distribution and length of drill periods have been made by Kirby, Hahn and Thorndike, and Reed.

1. Kirby studied the value of drill periods of different length. Four groups of pupils from grade IV were drilled in addition for forty-five minutes as follows:

GROUP	INITIAL PERIOD	PRACTICE PERIOD
1	15 minutes	2 periods of 22.5 minutes
2	15 minutes	3 periods of 15 minutes
3	15 minutes	7 periods of 6 minutes plus 1 period of 3 minutes
4	15 minutes	21 periods of 2 minutes plus 1 period of 3 minutes ⁸

The results are shown in Table XXV.

TABLE XXV.—GAIN MADE BY PUPILS OF GRADE IV WHO WERE DRILLED IN ADDITION, THE PERIODS BEING OF DIFFERENT LENGTHS⁹

GROUP	NUMBER OF PUPILS	DISTRIBUTION OF TIME	GAIN IN AVERAGE NUMBER OF PROBLEMS SOLVED
1	194	2 periods of 22½ min.	11.0
2	104	3 periods of 15 min.	13.6
3	205	7 periods of 6 min. plus 1 period of 3 min.	10.7
4	229	21 periods of 2 min. plus 1 period of 3 min.	16.1

⁸T. J. Kirby, *Practice in the Case of School Children*, Teachers College Contribution to Education, No. 58, p. 46. New York: Teachers College, Columbia University, 1913. (Data used with permission of the publisher.)

⁹*Ibid.*, p. 46. (Data used with permission of the publisher.)

The improvement was measured by the gain in the number of examples solved in the final test period. The result was in favor of short periods distributed over a long time.

2. Hahn and Thorndike repeated the experiment of Kirby using sections A and B of grades IV, V, VI, and VII. The B sections received drill periods of 5, $7\frac{1}{2}$, 10, and $11\frac{1}{4}$ minutes respectively. The A sections received drill periods just twice as long. The results are shown in Table XXVI.

TABLE XXVI.—GAIN MADE BY PUPILS OF GRADES IV TO VII WHO RECEIVED DRILL PERIODS OF DIFFERENT LENGTHS IN ARITHMETIC¹⁰

GRADE	TIME IN MINUTES	AVERAGE GAIN IN NUMBER OF PROBLEMS
VII A	$22\frac{1}{2}$	21.5
B	$11\frac{1}{4}$	18.6
VI A	20	10.8
B	10	13.5
V A	15	17.6
B	$7\frac{1}{2}$	15.2
IV A	10	17.9
B	5	8.7

This experiment showed that the length of the drill period probably should vary to suit the age of the pupils and the nature of the learning material.

3. Reed shows that a sixty-minute period is not nearly so profitable for adults as an equal amount of time split into ten-minute or twenty-minute periods. He divided a group of two hundred three college students into four approximately equal groups. They were given problems of five three-place numbers to add. The time was distributed among the four groups as follows:

Group 1, sixty minutes continuously (one day only),

Group 2, twenty minutes a day for three days,

¹⁰H. H. Hahn and E. L. Thorndike, "Some Results of Practice in Addition under School Conditions"; *Journal of Educational Psychology*, 5 (February, 1914), 71. (Data used with permission of the authors.)

Group 3, ten minutes a day for six days,

Group 4, ten minutes every other day for twelve days.¹¹

The gain was measured by the percentage of improvement in the last ten minutes over the first ten minutes both in the number of examples attempted and in the number added correctly. The results are shown in Table XXVII.

TABLE XXVII.—GAIN MADE BY PUPILS WHO RECEIVED DRILL PERIODS OF DIFFERENT LENGTHS IN ARITHMETIC¹²

GROUP	TIME	GAIN IN NUMBER ATTEMPTED	GAIN IN NUMBER RIGHT
1	60 min. for 1 day	10.9	12.2
2	20 min. for 3 days	35.9	43.4
3	10 min. for 6 days	33.1	33.6
4	10 min. every other day for 12 days	28.6	35.1

Reed commenting on this experiment says:

This experiment suggests that the drill periods be short enough to avoid fatigue and close enough together to avoid forgetting from one period to the next. They should also be long enough to get some work done and be far enough apart for one period to give the next the benefit of stimulated nutrition and exercise. Within these limits there appears to be a comparatively wide range within which one length of practice is just as valuable as another.¹³

d. Ease of learning is increased by relating the learning activity to the child's experience and activities. An experiment showing this was made by Smith with 180 pupils of grade I. The experiment was in reading and lasted for five months. The pupils were divided into experimental and control groups. For the experimental group the drill work

¹¹Homer B. Reed, *Psychology of Elementary School Subjects*, p. 134. Boston: Ginn and Company, 1927. (Quoted with permission of the author.)

¹²*Ibid.*, p. 135. (Data used with permission of the author.)

¹³*Ibid.*, p. 135. (Quoted with permission of the author.)

in reading consisted of making a series of pictures by cutting up large pictures and piecing the parts together to form other pictures. The pictures and their names were made into a "dictionary" in which the name of the picture appeared in both print and script. After each picture was made, a story describing it was composed and read by the pupils. The results of the experimental study are shown in Table XXVIII.

TABLE XXVIII.—RESULTS FROM RELATING READING ACTIVITIES TO THE PUPILS' INTERESTS AND ACTIVITIES¹⁴

TEST	MEDIAN SCORE	
	EXPERIMENTAL	CONTROL
Gray Oral Reading	42.5	0
Haggerty Test 1	4.8	1.1
Haggerty Test 2	4.4	1.8
Detroit Group Vocabulary	27.6	16.8
Detroit Story Picture	3.3	1.2

The results are plainly in favor of the group which had its reading activities related to the pupils' interests and activities. The reading activities for the experimental group brought a transformation of meaning because they were related to the pupils' interests and activities. In the opinion of Smith the experimental group gained as much in five months as grade I pupils usually gain in one year.

e. Ease of learning is increased by intensifying the presentation of the learning activity. Other things being equal, those learning activities that make an intense, vivid impression at the time of their presentation are easily learned.

The value of intensity has long been recognized. Colvin says:

The use of stereoscopic slides in the study of geography, history, and the natural sciences is an admirable case in point. It gives a con-

¹⁴Nila B. Smith, "An Experiment to Determine the Effectiveness of Practice Tests in Teaching Beginning Reading"; *Journal of Educational Research*, 7 (March, 1923), 221. (Data used with permission of the editor.)

creteness and reality which cannot be obtained in any other way. Charts, models, maps, and concrete materials of all sorts should be utilized. It should, however, be remembered that such materials are to be used to illustrate the thought and not as ends in themselves.¹⁵

By intensity is meant not merely sensory vividness. It includes also the vividness of meaning and the intent or will to learn. An activity that has significance attracts attention. The significance may come through the intent or determination of the learner to learn. When one *wills to learn* and makes varied efforts, some efforts succeeding, others failing, one finally learns to do the thing correctly because the correct way is intensified through the satisfaction that comes with the success. And whatever one tends to do with success and satisfaction, one tends to do over again.

That the intensity of presentation does make a difference is shown by Reed, who quotes from the experiment of Lay. A number of experiments were made with children from the first school year to the sixth, the object of the experiments being to find out through which sensory organ certain verbal

TABLE XXIX.—AMOUNT OF ERROR IN SPELLING IN RELATION TO MODE OF PRESENTATION¹⁶

MODE OF PRESENTATION	PERCENTAGE OF ERROR PER PUPIL
Hearing, without speech movement	3.04
Hearing, and speaking letters softly	2.69
Hearing, and speaking letters loudly	2.25
Seeing, and silent reading of letters	1.22
Seeing, and speaking letters softly	1.02
Seeing, and speaking letters loudly	0.95
Spelling aloud	1.02
Copying, and speaking letters softly	0.54

¹⁵S. S. Colvin, *The Learning Process*, p. 153. New York: The Macmillan Company, 1923. (Quoted with permission of the publisher.)

¹⁶Homer B. Reed, *Psychology of Elementary School Subjects*, p. 236. Boston: Ginn and Company, 1927. (Quoted with permission of the author.)

materials are most effectively presented. Nonsense syllables were used as a spelling lesson and about thirty children were included in each experiment. Table XXIX shows the results.

A similar experiment conducted by Baird and reported by Reed in which words were used instead of nonsense syllables yielded confirming results as given in Table XXX.

TABLE XXX.—AMOUNT OF ERROR IN SPELLING IN RELATION TO MODE OF PRESENTATION¹⁷

FORM OF PRESENTATION	PERCENTAGE MISPELLED
Pronounced only	6.48
Heard and spelled aloud by pupil	4.66
Only shown to pupil	2.60
Seen and spelled aloud by pupil	2.27
Seen, used, spelled, and written by pupil	1.00

Pearson reports a comparison of two methods of teaching spelling, one in which the spelling of the word was intensified and the other in which the ordinary classroom methods of study were used. Two classes from each of grades IV to VII were used and were called the control and experimental classes. The control class from each grade had independent study, that is, the pupil followed his own devices for study of his lesson. In the experimental class from each grade the following methods for intensifying the word were used:

- i. The first word was written on the board and then studied as follows:
 - (a) Its meaning was given, and used in a sentence.
 - (b) It was spelled aloud in concert, and individually by poor spellers.
 - (c) Its peculiarities, such as silent letters, *ei* and *ie* combinations, etc., were pointed out.

¹⁷*Ibid.*, p. 236. (Quoted with permission of the author.)

- (d) The word was written once, twice, or three times by pupils who spelled it silently as they wrote.
- Each word in turn was written on the board and studied in this same way.
 - Next, the whole column was reviewed orally, the children first spelling each word from the board, and then, turning from the board, spelling again (either silently or aloud) and verifying results by consulting the board.¹⁸

The result of the experiment is shown in Table XXXI.

TABLE XXXI.—RESULTS IN SPELLING IN RELATION TO MODE OF PRESENTATION¹⁹

	GRADE				TOTAL AVER. DECREASE IN ERRORS
	IV	V	VI	VII	
Number of pupils in each class. . .	20	20	23	20	
Control class: average decrease in errors per pupil.	2.63	4.15	5.56	6.65	4.74
Experimental class: average decrease in errors per pupil.	5.95	9.15	9.56	9.10	8.44

In each instance the results showed a gain in favor of the experimental groups for whom the spelling was intensified through various means.

Summary. Ease of learning is increased by increasing the meaning of the material, by observing the relationships in the material, by increasing the number of attentive repetitions, by relating the material to the pupil's interests and activities, and by intensifying the mode of presentation. This becomes, then, one of the practices in the Learning-Product Technique: to increase the ease of learning through formation of a variety of worth-while associations.

¹⁸H. C. Pearson, "Experimental Studies in the Teaching of Spelling"; *Teachers College Record*, 13 (January, 1912), 58. (Quoted with permission of the publisher.)

¹⁹*Ibid.*, p. 61. (Data used with permission of the publisher.)

SUGGESTIONS AND STUDY HELPS

1. Tell how you expect to control associations so as to aid the pupil in economical learning.
2. When you "control" the formation of associations how do you provide for creative thinking?
3. Give an example showing how you expect to have your pupils observe points of similarity. Could not this method of learning be overdone?
4. Tell how you use the law of association to put *meaning* into a learning activity.
5. Tell how you use the principle of frequency (drill work) yet avoid monotony.
6. Explain in detail how you provide individual drill to meet the needs of each pupil.
7. Give an example showing how learning was facilitated for a pupil when he knew his errors and how to overcome them.
8. Give an example showing how learning was facilitated for a pupil when it was related to his experience or activities.

HELPFUL REFERENCES

- FREEMAN, FRANK N., *How Children Learn*. Boston: Houghton Mifflin Company, 1917
- JUDD, C. H., *Psychology of Secondary Education*. Boston: Ginn and Company, 1927
- O'BRIEN, JOHN A., *Reading: Its Psychology and Pedagogy*. New York: The Century Company, 1926
- PYLE, W. H., *The Psychology of Learning*. Baltimore: Warwick and York, 1921
- REED, H. B., *The Psychology of Elementary School Subjects*. Boston: Ginn and Company, 1927
- THORNDIKE, E. L., *Educational Psychology*. New York: Teachers College, Columbia University, 1925, Vol. II

VIII

USING VISUAL MATERIAL AS AN AID IN LEARNING¹

The growth of visual education. Visual education to some extent has long been used in our schools, though formerly not known by that term. For generations maps, diagrams, pictures, and models have been used, but in recent years the recognition of the value of this type of instruction has led to its further development and use. The use of visual presentation has grown until it is now included in most of the studies in the curriculum and could profitably be used in all of the subjects. Acceptance of new methods, however, is usually slow and there is still too much of the lecture and textbook methods of instruction.

Visual devices and the learning process. Sense perceptions furnish the threads from which the child weaves his understanding. Children learn through reacting to perceptual stimuli and not alone through the printed page. Sense perceptions, physical reactions, and mental responses all involve pupil activity. No learning takes place except through some form of activity on the part of the pupil. Since visual material supplies ample and varied opportunity for pupil activity it follows that visual devices quicken and advance the learning process.

What is meant by visual aids. Visual aids educate by means of impressions gained through all the senses but largely through the sense of sight. This is in accordance with the generally accepted belief that the eye is the avenue through which the greater part of all human knowledge is received. The term "visual aids in instruction" usually calls up a vision of motion pictures, slides, or stereopticon views; but while

¹The author is indebted to Mae Weber Palmer for this chapter.

the value of these cannot be discounted there is a wealth of other aids that, for most schools, is more easily obtained. The educational possibility of all such visual material needs to be recognized and provision made for its adoption in the school work. Though there are many types of visual aids, this chapter will deal largely with the visual material that any teacher may obtain and use.

The school museum. The school museum contains an ever-ready source of material and is possible in even the remotest and poorest district. A school museum is a collection of objects of interest that will supply definite, concrete illustrations. The size and quality of the museum will vary according to the locality, types of children, and the thought and alertness of the teachers. Its value as a teaching device cannot be too highly rated. The contributions for the school museum may be collected entirely through the efforts of teachers and pupils. It is not limited to the work of the science classes, as is usually the case, but may be well utilized by the teacher of any subject.

Arousing interest. The teacher should first establish the need for a museum in the minds of the pupils and awaken, by judicious teaching, a desire to contribute to this worthy school agency. Pupil interest in the museum is then quickened into pupil activity in procuring material. Even though much material of little or no value may be offered, the teacher can tactfully dispose of such and keep only the best contributions for exhibition. However, in its due place even the humblest offering may have value.

Sources of material. Curios from home may be loaned or given a permanent place in the museum. Pupils planning to take trips may discuss the possible finds of the district and may be encouraged to be alert in collecting. The museum thus furnishes a new zest for travel. The pupil now has an

object in view. New interests loom before him and his travels take on new meaning. Consequently the museum grows in import as well as content. Collections representing remote parts of the globe are possible even though the pupils and teachers take no trips. By means of school correspondence interesting and worth-while exchanges can be made that will be of mutual benefit. Even if no exchange be desired, the requested contribution will invariably be sent. Schools of our islands, of South America, of Alaska, Canada, or India, all have valuable offerings and are willing to coöperate.

Care of visual material. A collection of visual material is best taken care of in the cases or cabinets that constitute the school museum. The material may be kept in any convenient place for class or individual use. However, it is fraught with greater meaning when placed on exhibition. Viewing the satisfactory results of his own labor spurs the pupil to further activity; and since the museum should be a growing project it is wise to keep alive the pupil's interest in it.

Material from local industries. Local industries are always glad to furnish specimens of both raw and manufactured materials. Many industries have special exhibits for schools and also descriptive booklets and desirable charts and diagrams that are furnished gratis, or at a small cost.

Magazines and pictures. Magazines may be contributed by the pupils or the teacher or procured by penny collections, or they may be requested from the publishing houses when used for school work. Pictures singly, or in sets, are good illustrative material and may be procured at little or no cost. Much usable material in the form of advertising is sent out by book concerns. Other companies, in the interest of education, furnish pictures valuable in teaching.

Mounted specimens. Mounted specimens and preserved objects furnish good visual devices. The humblest school

has access to much that can be converted into fine illustrative material. Preservation and mounting are matters of but little expense and beside furnishing good objective material provide opportunity for activity, initiative, and originality among the pupils.

Value to pupil of collecting. Pupil participation in procuring visual material is an active and efficient agent in stimulating and facilitating the learning process. The pupil is provided with concrete experience and thought, and these result in spontaneous learning. Forced learning is always irksome. It is spontaneous learning that attaches itself to the concrete experience and to active participation. Spontaneous learning, highly profitable, is offered in the form of field trips and school journeys. A field trip provides visual material of prime importance. Here is direct contact with the concrete. Here are the natural phenomena in their proper setting. Here is provided a wealth of opportunity for pupil activity. Certain required activities may be planned in advance such as relate to the drawing, observation, collection of specimens, or identification of objects, but much will necessarily be done on the spur of the moment as suitable material presents itself. On the field trip the pupils are active agents in their own education and not merely passive recipients. Fresh air, deep breathing and physical exertion promote alertness and stimulate the constructive, creative thinking that is engendered by the pupils' observations and discoveries. Instruction following such a trip is enriched and vitalized to an extent not realized by those teachers who have never employed this teaching method.

Visual material provides ease in learning. Visual aids are economical mediums for the conveyance of ideas and accomplish the most with the least expenditure of time and effort on the part of both pupil and teacher. A child cannot view

a brick structure, or even a brick, with entire indifference after having the process of brick manufacture presented to him by means of visual aids. The initial step in brick-making may be presented by a series of slides showing the mining of fire clay as it is done to-day in both simple and highly up-to-date mines. Further slides, presenting the various processes of brick-making, from the crushing of the clay to the firing of the bricks, and their transportation, open up a new world of understanding to the pupil and provide him with vivid and lasting impressions. The time consumed in such a presentation yields larger returns than any other method of imparting the same knowledge. Additional visual aids, easily obtained, for use in this same study are specimens of fire clay and samples of a variety of bricks. Portfolios of beautiful homes may further be used if the study involves some civic project or some project relating to the home.

We may class as a teaching aid anything that increases ease of learning. We welcome short cuts in educational methods when it is proved that they do aid in producing desirable changes and new ways of behaving on the part of the pupil. Visual material supplies ample opportunity for increasing the ease of learning. Association, intensity of the impression, and repetition are brought into constant play through the use of visual and illustrative materials. The use of association, intensity, and repetition as related to visual materials are discussed in the following pages.

a. The use of association.² The law of association operates successfully and freely through the use of visual material. Not only are satisfying associations made in one particular subject but correlating associations with many other subjects in the curriculum are made. Even with no assistance from the teacher much of the visual material becomes linked

²See Chapter VII, p. 143.

in the pupil's mind with other fields of study. The learning process is thus facilitated through association. The use of association is active in every instance in which the visual aid is coupled with a new or known idea and repetition is effected by the fact that knowledge of the visual aid is brought to mind though it may be but momentarily as the new association is made. Initiative of pupils is an important factor in relating any illustrative material to other ideas and situations. Coöperation of interested and interesting teachers will make occasion for, and strengthen, these associations.

A wealth of associations lies in the fossil specimens of an ancient fern tree. It may have been found by a class on a field trip and served first of all in the study of botany, contrasting early forms of plant life with the present. Then the fossil could be used in science or in geography, in the study of coal formation. The beautiful, regular pattern of leaf scars on the stone trunk would also make an unusual design for study in art.

When the profound value of illustrative material is known and accepted by teachers even so trite an object as a piece of beeswax or a water-worn pebble becomes worth while. A bit of beeswax may link together, through association, such subjects as nature study, zoölogy, geography, science, civics, and literature.

The same visual aid may serve many grades as well as many subjects. The following studies were developed through their association with an owl. A beautiful horned owl, killed by an irate farmer for raiding his hen house, came into the hands of the present writer. The bird was mounted and gave rise to various studies and discussions as follows:

1. A study of provisions for birds in winter grew out of the fact that the owl was killed in January and was found by the taxidermist to be half starved.

2. Belonging in the order of *Raptores*, the owl provided an incentive for the study of such birds and their prey.
3. Economic value of birds was studied and then trees as the homes of birds were discussed.
4. A bird-feeding station was established and regularly stocked with food.
5. The value of trees in their relation to the water supply of a country was next introduced.
6. Arbor and bird day received appropriate attention.
7. And finally weather and climate as related to animal and bird life closed the series of studies and discussions.

Such associations provide linkage for the various subjects in the curriculum and tend to weld the subjects into a harmonious whole.

b. The use of intensity.³ Things are best remembered if a vivid impression is made at the time of presentation. Thought illustrations that are concrete have vivid reality that cannot be obtained in any other way. All visual aids are concrete thought-illustrations. Meaningful material is attractive and arouses interest in itself. But such material makes the most vivid impression when it accompanies an explanation by the teacher and is associated with the proper ideas. Then the visual aid holds not only sensory vividness but vividness of meaning. A water-washed pebble showing a half-dozen layers of rock each a different color or shade is an object of interest in itself; but when used as an illustration of rock or soil formation, then such study is enriched and given a varied and vivid meaning.

Vivid and lasting impressions are made through the use of Indian relics, objects of industry, implements of warfare, rude musical instruments, baskets, blankets, and bead work. The appearance, the feel, the smell, the sound, all produce

³See Chapter VII, p. 153.

vivid perceptual experiences⁴ that, when associated with the appropriate instruction, provide for long-remembered knowledge.

The study of Longfellow's *Hiawatha* takes on a new meaning when an Indian bow and arrowpoints are used. Birch bark, such as used by the Indians for canoes, may be obtained. Then the pupil "sees" and "feels" the "white skin wrapper" and almost hears the birch tree rustle "take my cloak, O Hiawatha."

Some of the difficulties of literature teachers would be lessened if visual material were more commonly used and suitable explanation given to couple the visual aid with the selection under study. A robin's nest and eggs give color and life to "The Planting of the Apple Tree." Indeed, what bit of school literature is too abstract for a concrete illustration?

In lending vividness and intensity to the things taught, the teacher is providing the pupil with an aid to permanent retention. Illustrative material, properly used, creates in the pupil a satisfaction in the study of the subject due to an understanding of what it is all about. This satisfaction speeds up the learning process by giving the child a sense of his own progress. When a pupil knows he is making progress in the subject he will achieve greater results.⁵ The satisfaction gained in knowing one's progress tends to transform the meaning and to produce more and better work.

c. The use of repetition.⁶ Attentive repetition, or frequency of the projection of an idea, makes for a more lasting impression. The importance of this principle of learning lies in the fact that the more often an impression is repeated the more it will tend to become permanent. Good teaching technique employs repetition methods that avoid monotonous

⁴See Chapter II, p. 27.

⁵See Chapter XIII, p. 270.

⁶See Chapter VII, p. 149.

drill. If we can present the same idea in a new guise or under different conditions we may impress the same thought a number of times with a gain instead of a loss of interest. By the adaptation of visual aids, stimulation materials are provided, the instruction vitalized and enriched, and thus with no aspect of monotonous drill the operation of repetition is insured.

Recognition of the worth of illustrative materials has led many school executives who maintain high educational standards to organize the visual work on a large scale to include all the studies. If certain major topics of interest were to be emphasized by all teachers it would be a long step forward in cementing the various subjects of the curriculum and bringing about a unity in study as well as more enjoyable relations between teachers. Each would have something to contribute to the study under development in keeping with his subject. Many sides of the main topic of interest would be touched upon, various viewpoints would be offered, and the principle of repetition would be exercised extensively. The study of Spain might be the unit under consideration. Through visual treatment by many teachers, each developing the study in keeping with his subject, the study of Spain would take on new and vivid meaning. No one teacher can furnish as wide a conception of a single subject as a number of teachers who employ to the best of their ability the visual methods at their command. By this many-sided presentation, a new and wider viewpoint is given the pupil.

The learning product to be attained might be stated in terms of "a personal acceptance of the worth and value of Spain" that would include a knowledge of Spain's former commercial advantage, an appreciation of its art, understanding of its rise and decay, present political and

social status, and its place in the world at large to-day. Under this multiple instruction the physical director could use Spanish gymnastics and dances introducing the costumes of the country. The art department could employ such art and sculpture as the country has produced. Literature and dramatic teachers would find a wealth of material that would lend itself to various purposes, some of the material being dramatized. Geography and history also would have valuable contributions to make. The ideas of Spain thus gained through varied treatment under a number of instructors would color and intensify the impressions and provide richly for repetition and association.

Individual differences.⁷ Illustrative materials provide a means of disclosing individual differences. Instruction adapted to the individual needs of the pupil can be given only when the individual differences have been determined. Individual differences include not only differences in ability to achieve but differences in special abilities and tastes and interests. The learning process is quickened when a teacher can appeal to a special taste or inclination of a pupil. When a pupil's pet hobby or special ability is recognized and sympathetically received by an instructor a new avenue of approach in instruction is opened and an understanding between pupil and teacher set up. The existence of the understanding is a point of personal contact that forms a bond of understanding kinship between pupil and teacher. Even the dumbest pupil has some major interest that may not be manifest to the teacher; but if some such interest can be determined, the learning process for that pupil is quickened.

Exploratory tests will reveal the character of the pupil's previous acquaintance with the learning product under consideration and the instruction may be built accordingly.⁸

⁷See Chapter IV, p. 70.

⁸See Chapter V, p. 97.

Individual differences in knowledge content are thus determined and the special abilities disclosed. The varied nature and manifold association of visual material provide unequalled opportunity for revealing the pupil's special aptitudes and interests. For example, a certain boy of low I. Q., for whom no school study held much interest, suddenly evidenced an alertness and effort hitherto entirely foreign to him. Dull of eye and slow of movement, his teachers had always expected little of him and accordingly had received even less. His awakening followed a class trip for bird study conducted by the present writer. The boy's ability to recognize and describe birds was surpassed by none of the other pupils. He exhibited a love for and skill in woodcraft in which he had no previous training. In the classroom in later recitations he plied his teacher with questions raised by the trip and was eager for further excursions. He now worked in class, accomplished something, and raised his grades considerably. In other words, he had a special fondness for the outdoors. His interest was recognized and encouraged by the teacher. This particular interest in woodcraft roused him to an effort which carried over into other school work and accelerated his learning appreciably. He now felt, for perhaps the first time, the exultation of excelling in class.

Individual and group activities that grow out of the use of visual material. The great variety of illustrative materials gives a wide range of appeal to pupils and assists in determining the existence of individual differences among them. Some of the individual and group activities that may be suggested are:

1. Active interest in collecting for museum.
2. Writing schools for exchange of material.
3. Collecting specimens.
4. Mounting specimens.

5. Providing for the preservation of perishable material.
6. Labeling objects and specimens.
7. Composing descriptions of objects.
8. Participating in school trips.
9. Taking individual trips:
 - a. To solve economic problems.
 - b. To secure geographic data.
 - c. To investigate certain localities.
 - d. To secure certain material.
10. Visting local concerns:
 - a. To secure information.
 - b. To make science report.
 - c. To solve problem.
 - d. To secure school material.
 - e. For personal satisfaction.
11. Advertising visual material in order to acquaint other pupils and teachers with school museum.
12. Undertaking some individual project:

To make some mechanical device such as a radio.
13. Exercising initiative in experimentation and investigation.

These varied activities provide sense perceptions that are tactual, gustatory, olfactory, and auditory, as well as visual. With instruction so amplified and enriched, the pupil's individual interests are met and his knowledge content is augmented with a marked reduction in time and effort.

Summary. The use of visual material as an aid in learning is constantly increasing. As an aid in learning it furnishes perceptual experiences, arouses interest, builds associations, makes the meaning of material more vivid, provides for repetition of the learning process, and discloses individual differences. This becomes, then, one of the practices of the Learn-

ing-Product Technique: to use visual material as an aid in learning.

SUGGESTIONS AND STUDY HELPS

1. Make a comparison of time consumed, effort expended, and learning products attained, between a lesson as ordinarily taught and one enriched with visual aids.
2. Keep a personal record of outstanding cases of pupils that exhibit keener interest and put forth greater effort under visualization methods, giving details as they appear to you.
3. List those visual materials that provide the widest range of appeals to the pupil, that is, exercise the law of association most extensively.
4. List the different ways that visual material may be secured in your locality.
5. Make a list of the individual differences that you have discovered in pupils through the use of visual aids.
6. Do you provide for the use of materials rather than for discussion of them? What provisions are you making for pupil activity?
7. Plan a trip in detail for the purpose of securing visual material or information about it.
8. What methods can you suggest to advertise to pupils and teachers the use and possibilities of visual aids?

SOURCES OF VISUAL MATERIAL

Education Screen, Inc., 5 S. Wabash Ave., Chicago, Ill.
Industrial Art Coöperative Service, Inc., 1256 Amsterdam Avenue,
New York City,
Bureau of Commercial Economics, 1108 Sixteenth Street, N. W.,
Washington, D. C.
Visual Instruction Service, Extension Division, North Dakota Agricultural College.
Department of the Interior, Bureau of Education, Washington, D. C.
"Illustrative Material," by Fay Griffith, State Normal School, Terre Haute, Indiana. (Contains a list of about 200 companies that supply illustrative material free or at small cost.)

IX

TESTING FOR EVIDENCE OF THE LEARNING PRODUCT

The purpose of a test. All learning is a change, a transformation of processes on the part of the learner, and should produce desirable and worth-while ways of behaving in the pupil. These ways of behaving are properly called *learning products* and should be set up in terms of self-actuated pupil activities. If the pupil has already attained the learning product the initial exploratory test will reveal it. If the pupil has not attained the learning product then he must be taught. In order to determine if true learning has taken place during the teaching process it is necessary to compare the pupil's initial score before he was taught with his status after he has been taught. If there is a change, a transformation of processes, he has learned. If there is no change, then he has not learned. It follows, therefore, that the purpose of a test is to secure evidence from which one may infer the presence or absence of the learning product.

The basic principle in test construction. There is one basic principle that the teacher should observe in the construction of all tests and that is to focus the test directly upon the learning product. The form of the test questions, whether of the completion type, the performance type, the essay type, the multiple-choice type, or the alternate-response type may well be left for each teacher to decide. This is because the phrasing of the test questions must necessarily be dependent upon variable factors such as: (a) the age and maturity of the pupil; and (b) the nature of the learning product. The basic principle, however, that the teacher should observe in the construction of all tests is: *the test must be focussed directly*

upon the learning product. The world is so full of a number of things that there is not time to test for every isolated fact that has been learned. The teacher, therefore, should set up learning products in terms of pupil activities and ways of behaving and test for evidence of the presence of these learning products. The learning product may be a change in the pupil's ability to do, a change in his understanding, or a change in his personal acceptance of worth and value. But whatever the change may be, the purpose of a test is to disclose evidence of the presence or absence of the learning product. In order to furnish this evidence the test must be focussed directly upon the learning product.

Evidence of the learning product. Evidence of the presence or absence of the learning product may be secured by means of: (a) the exploratory test; and (b) the attainment test.

a. The exploratory test. The exploratory test is given preceding the presentation of the learning product. As its name implies, the exploratory test is used to explore the experiential background of the pupil relative to the presence of the learning product. The value of the exploratory test is that it reveals the needs of each pupil, thus forming a basis for individualizing the learning activities to meet such needs. The content of the exploratory test, with examples, was discussed in Chapter V, to which the reader is referred for a more complete treatment.

b. The attainment test. The attainment test, as its name implies, is to measure the pupil's learning in terms of attainment of the learning product. Here, as in the exploratory test, the purpose is not that of grading or promotion, but is to secure evidence from which to infer the presence or absence of the learning product. No arbitrary score can be selected as denoting attainment. What the teacher must keep in

mind is that she is testing to secure evidence of the learning product and that no predetermined standard or passing grade is to stand in the way. The writer has known of pupils who in the attainment test showed evidence of the learning product but who were failed in the subject because of low daily scores. This implies a false notion of the learning process. Evidence of the attainment of the learning product and not the number of weaknesses and difficulties should be the criterion for promotion.

A good technique is to use the same test both as an exploratory test and as an attainment test. This is because both tests are for the same purpose, to disclose evidence of the presence or absence of the learning product.

Examples of tests. Examples of tests are shown in the pages immediately following. In each of these tests an attempt has been made to focus the test not upon subject matter but directly upon the learning product to be attained. Tests in different subjects and for various grades are shown. Each test is focussed upon one of the three types of learning products. These examples are given not as perfect models, but rather to direct the thinking of the teacher as she constructs tests for her own pupils.

a. Tests focussed upon the learning product ability to do. The content of these tests requires performance of the activity that produces the ability to do. For example, if the learning product be ability to read then the test requires the pupil to read; if the learning product be ability to divide then the test requires the pupil to divide; if the learning product be to use capital letters correctly then the test requires the pupil to use capital letters.

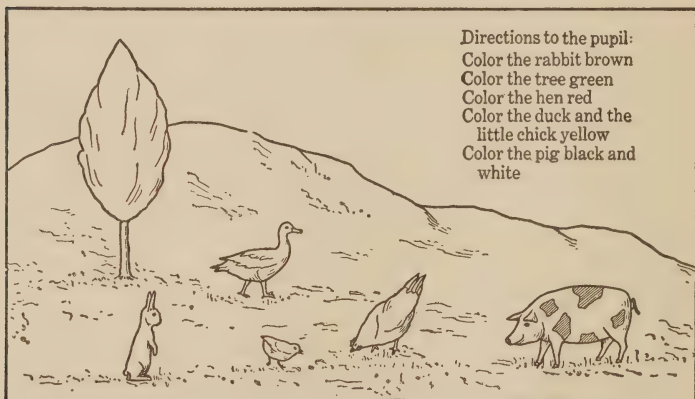
Examples are presented in: reading, arithmetic, English, and algebra.

Grade I. Reading

Learning product to be tested: ability to do.

Specific learning product: to read short sentences.

In the following test the ability to read short sentences is tested by the use of directions to the pupils to color the figures. In order for the pupil to perform the activities suggested in the test he must be able to read the sentences. Coloring the figures is introduced merely as a variation for motivating the reading. The directions are executed as a means of demonstrating the ability to read. This ability to read is the learning product that the test attempts to measure.¹

*Grade IV. Arithmetic*

Learning product to be tested: ability to do.

Specific learning product: to divide correctly.

The test does not call for an understanding of the processes of division but merely for the ability to perform the operations as indicated. In order for the pupil to solve the problems correctly he must have learned the correct methods during a learning period. Through a transformation of processes

¹The author is indebted to Mae Weber Palmer for contributing this test.

he should be able to divide correctly without stopping to reason out the solutions.

DIVISION SCALE² (Selected portions)

(1) $3\overline{)6}$	(2) $9\overline{)27}$	(4) $1\overline{)5}$	(5) $9\overline{)36}$	(6) $3\overline{)39}$
(7) $4 \div 2 =$	(8) $9\overline{)0}$	(11) $2\overline{)13}$	(15) $\frac{1}{4} \text{ of } 128 =$	
(22) $2\overline{)13.50}$	(26) $12\overline{)2.76}$	(20) $21\overline{)252}$		
(31) $\frac{5}{4} \div \frac{3}{5} =$	(32) $9\frac{5}{8} \div 3\frac{3}{4} =$	(30) $\frac{3}{4} \div 5 =$		

Grade VII. English

Learning product to be tested: ability to do.

Specific learning product: to use capital letters and punctuation marks correctly.

In order to detect an error and intelligently correct it, the pupil must have acquired the ability to use punctuation marks and capital letters correctly during the learning period. Now, upon being tested, the responses to the questions should be automatic in nature.

This is a selection paper. There is at least one error in each of the following sentences. Correct, or complete as the case demands.³

PART I

1. a stitch in time saves nine.
2. Who was it said All that glitters is not gold?
3. He asked me where I was going
4. scott is the author of kenilworth.
5. We shall go on tuesday.
6. He cried, "O joy, i am saved at last."
7. People came in great crowds from the north.

²The Woody Division Scale, Series A. Published by Teachers College, Columbia University, New York City. (Quoted with permission of the publisher.)

³Charles Russell, *Classroom Tests*, p. 120. Boston: Ginn and Company, 1926. (Quoted with permission of the publisher.)

8. The form of that play is somewhat different from the italian form.
9. The items of the bill are as follows: apples oranges grapes
bananas
10. new hampshire is east of vermont.
11. John, i and James are going
12. Mary, John, you and I are to go.
13. Little Boy Blue
Come blow your horn,
the sheep's in the meadow,
the cow's in the corn.
14. Considering that first, how should it be handled
15. It was sent to Mr J L Smith.
16. we remain,
Yours very truly,
Smith Gray and Co.
17. Mr. Henry Irving
my dear sir:
18. childrens clothes are for sale here
19. That happened in April 19 1775.
20. Its a shame the bird broke his wing.

Grade IX. Algebra

Learning product to be tested: ability to do.

Specific learning product: to solve correctly addition and subtraction in algebra.

In order for the pupil to add or subtract correctly he must have learned the processes during the learning period. Now on being asked to solve the problems he should be able to do so without stopping to reason about the processes. His responses should be automatic in nature.

ALGEBRA⁴ (Selected portions)

- | | |
|-------------------------------------|---|
| 1. $4r + 3r + 2r =$ | 3. $12b + 6b - 3b =$ |
| 7. $5m + (-4m) =$ | 10. $8c - (-6 + 3c) =$ |
| 13. $\frac{3c}{4} - \frac{3c}{8} =$ | 24. $\frac{a}{a-2} - \frac{a-2}{a+2} + \frac{3}{4-a^2} =$ |

⁴The Hotz Algebra Scales, Series B, Addition and Subtraction. Published by Teachers College, Columbia University, New York City. (Quoted with permission of the publisher.)

b. Tests focussed upon the learning product understanding. The content of these tests provides novel or unexpected situations where the pupil is required: (1) to apply his knowledge of the vocabulary as related to the learning product; (2) to recall and apply certain organized facts and experiences as related to the learning product; or (3) to analyze and apply the principles involved in the learning product.

Examples are presented in: reading, hygiene, geography, history, arithmetic, science, and English.

Grade I. Reading

Learning product to be tested: understanding.

Specific learning product: to understand what I have read.

READING⁵

Fill the blanks with words that will make true sentences.

- (a) Mr. Squirrel wanted.....
- (b) Mr. Squirrel asked the sawmill for.....
- (c) The River said, "Cut down....."
- (d) The Merchant said, "I will give you a saw for....."
- (e) Mr. Squirrel got some good nuts for.....
- (f)made him a house.
- (g) This made Mr. Squirrel.....

a little house	some lumber
a tree	the carpenter
the Merchant	a warm nest
very happy	the wood
some nuts	some bricks

Grade IV. Hygiene

Learning product to be tested: understanding.

Specific learning product: to understand how sleep habits are related to health.

⁵A. S. Gist and W. A. King, *The Teaching and Supervision of Reading*, p. 265. New York: Charles Scribner's Sons, 1927. (Quoted with permission of the publisher.)

HEALTH HABITS⁶

This is a judgment paper. In the blank lines below write a short sentence which will tell the best reason you know why each of the statements is true. Do your best. Write clearly.

1. Plenty of sleep is necessary for good health.
Answer.....
2. A child needs more sleep than a grown-up person.
Answer.....
3. Going to bed at a regular time is an important health habit.
Answer.....
4. Everyone should sleep with windows open.
Answer.....
5. Children should not sleep on high pillows.
Answer.....
6. It is best not to play hard or exciting games just before going to bed.
Answer.....
7. People who eat hearty suppers late at night or drink tea, coffee, or cocoa just before going to bed may not sleep well.
Answer.....

Grade V. Science

Learning product to be tested: understanding.

Specific learning product: to understand the habits of certain birds.

The test calls for association of the names of certain birds with the characteristics of these birds. In order for the pupil to answer the questions correctly there must have been a transformation of processes through which the pupil acquired an understanding of the habits and characteristics of certain birds. Upon being tested the pupil should recall and associate the name of the bird with the appropriate characteristic.

SCIENCE⁷

The never builds her own nest.

The is called the "Policeman of the Woods."

⁶Charles Russell, *Classroom Tests*, p. 86. Boston: Ginn and Company, 1926. (Quoted with permission of the publisher.)

⁷The author is indebted to Mae Weber Palmer for contributing this test.

The "Preacher Bird" is the

The is called the "Bee Bird" by farmers because it eats the drones.

The is called the "horse hair sparrow" because it always lines its nest with horse hair.

..... never build their nests till August.

The is the only bird that eats potato bugs.

Grade VII. Geography

Learning product to be tested: understanding.

Specific learning product: to understand why South America produces certain products.

SOUTH AMERICA⁸

TEST ONE. The correct or best-answer test.

Place a cross before the best answer to each of the following questions:

1. Why has Ecuador made but little progress?

- (1) The hot, rainy coastal plain has many cacao plantations.
- (2) Large quantities of tin and copper are mined in the mountains.
- (3) The interior is mountainous; the coastal plain is a desert.
- (4) The Indian population is lazy.

2. Why is the Caribbean Sea coast of greater value to Venezuela than the Orinoco River?

- (1) Healthful, fertile highlands are near the Caribbean Sea.
- (2) The Caribbean coastal plain is healthful and fertile.
- (3) Agriculture is very important in the Orinoco Basin.
- (4) The Orinoco River is navigable far into the interior of Venezuela.

3. Why does Brazil produce less of the world's rubber than formerly?

- (1) The Amazon lowlands are hot and rainy.
- (2) The rubber trees have been cut down to make way for farming.

⁸M. E. Branom, *The Measurement of Achievement in Geography*, p. 116. New York: The Macmillan Company, 1925. (Quoted with permission of the publisher.)

..... (3) Rubber trees flourish on the plantations of southeast Asia.

..... (4) Brazil has a republican form of government.

4. Why do the people of northern Chile prefer a desert?

..... (1) Rains would dissolve the nitrates.

..... (2) The coastline of the desert has many good harbors.

..... (3) The desert does not have wealth that will tempt countries to want it.

..... (4) Copper and nitrate are found in the desert.

5. Why is Santos a more important coffee-exporting port than Rio de Janeiro?

..... (1) Santos is a smaller city than Rio de Janeiro.

..... (2) Santos has a better harbor than Rio de Janeiro.

..... (3) Santos is nearer the coffee fields than Rio de Janeiro.

..... (4) Many Italians work in the coffee fields.

6. Why has Peru developed slowly?

..... (1) The hot, rainy coast is heavily forested.

..... (2) The desert, the forests, and the mountains make it difficult to improve transportation.

..... (3) Large herds of llamas and alpacas graze on the coastal plain.

..... (4) Coffee is an important product of the coastal lowlands.

High School. United States History

Learning product to be tested: understanding.

Specific learning product: to understand the development of chronological sequence in history.

"The problem of constructing tests of historical understanding becomes then a problem of devising exercises which will reveal the presence or absence of the type of understanding under investigation.

"The arrangement test . . . (Example B) is a suitable device for ascertaining the development of . . . chronological sequence."⁹

⁹Howard C. Hill, "The Use of Tests in the Teaching of the Social Studies," *The Historical Outlook*, 20 (January, 1929), 9. (Quoted with permission of the publisher.)

ARRANGEMENT TEST IN UNITED STATES HISTORY

EXAMPLE B¹⁰

Number the following events in accordance with the time order of their occurrence, placing the figure (1) before the earliest, a figure (2) before the next earliest, and so on:

Battle of Lexington.

Treaty of peace between the United States and Great Britain.

The Stamp Act.

American alliance with France.

The Declaration of Independence.

Battle of Saratoga.

The Intolerable or Coercive Acts.

Grade VIII. Arithmetic

Learning product to be tested: understanding.

Specific learning product: to understand the principle upon which corporations and stocks are based.

ARITHMETIC¹¹HOW PEOPLE OWN THINGS TOGETHER: CORPORATIONS
AND STOCKS

The pupils in the Winter School thought it would be good experience to run a school store. They appointed a committee to investigate the cost of supplies; the committee decided that about \$300 would be needed to open the store. Acting under the advice of a banker, Mr. Smith, the father of one of the children, they formed a company called the Winter Coöperative Society. They raised the \$300, called their capital, and issued 100 shares of stock at \$3 each. They said the par value of each share was \$3.

1. The pupils who intended to buy stock elected 5 pupils to act as a board of directors. What do you think their duties were?

2. The board of directors had certificates of stock printed in the school printing shop. Each stockholder was given one of these certificates, signed by the president and secretary of the company, telling how many shares of stock he had bought.

What does the certificate given below show? How does it differ from a promissory note?

¹⁰*Ibid.*, p. 8. (Quoted with permission of the publisher.)

¹¹J. R. Clark *Mathematics in the Junior High School*, p. 16. Yonkers-on-Hudson: Gazette Press, 1925. (Quoted with permission of the author.)

CERTIFICATE OF STOCK

Winter Coöperative Society

This certifies that FRANK JONES is the owner of FIFTEEN full-paid shares of the Capital Stock of THREE dollars each of the Winter Coöperative Society.

Transferable only on the books of the Company by the holder in person.

JOHN ABT, President

RUTH FISHER, Secretary

The Winter Public School, March 1, 1924.

3. Frank Jones became a stockholder in the company by buying 15 shares of stock. They cost him dollars.

4. Ruth Fisher paid \$..... for 5 shares.

5. When one of the stockholders, Agnes Scott, moved to another school, she decided to sell her 4 shares. She sold them to John Abt for \$2.50 each, or at 50 cents below par. At what per cent below par did she sell them?

6. Profits were small at first, but after a few months the company began to do a good business. John Abt thought he would buy 10 more shares, but no one was anxious to sell. Why? Finally he paid \$3.50 a share. This was 50 cents above par. What per cent above?

7. At the end of the first year the manager reported a net profit of \$52.50. The board of directors decided to set aside \$22.50 to be used to enlarge the business, and to distribute \$30 among the stockholders as a dividend. Each holder of one share of stock was entitled to $\frac{1}{100}$ of the dividend, or cents. What was the rate of the dividend?

8. Frank Jones owned 15 shares of stock. What was the amount of the dividend he received?

9. Helen owned 8 shares. She received a dividend of dollars.

10. Show that the stockholders received a good return on their investment.

11. How would the ability of the company to declare a dividend be affected if the manager were inefficient or dishonest?

12. One girl's father objected to her buying stock in the company. He knew that many stocks are worthless. Would you invest in a company about which you knew very little?

Grade IX. Science

Learning product to be tested: understanding.

Specific learning product: to understand the composition and properties of air.

GENERAL SCIENCE¹²

1. Carbon dioxide has a tendency to accumulate in wells because it is
 - a. Lighter than water
 - b. Heavier than air
 - c. Lighter than air
2. When air is heated it
 - a. Contracts
 - b. Changes in composition
 - c. Expands
3. The atmospheric pressure is measured by a
 - a. Thermometer
 - b. Barometer
 - c. Thermostat
4. The most useful kinds of barometers are
 - a. Aneroid and gas
 - b. Mercury and water
 - c. Mercury and aneroid
5. The siphon makes use of
 - a. The expansion of gases
 - b. The atmospheric pressure
 - c. The buoyancy of water
6. The most important principle involved in ventilation is that of
 - a. Conduction
 - b. Radiation
 - c. Convection

¹²F. C. Touton and Alice Struthers, *Junior High School Procedure*, p. 198. Boston: Ginn and Company, 1926. (Quoted with permission of the publisher.)

High School. United States History

Learning product to be tested: understanding.

Specific learning product: to understand the relationship between the past and present in the development of nationality.

ESSAY TEST IN UNITED STATES HISTORY

EXAMPLE C¹³

How do events, or conditions, which you have studied in connection with the unit, "The Development of Nationality," help to explain the following:

1. In 1815 Italy was a geographical expression; in 1920 Italy was a consolidated kingdom.
2. In 1815 France was under a monarchical government; in 1928 France was a republic.
3. In 1815 Austria-Hungary was one of the most important countries of Europe; to-day Austria-Hungary is only a memory.
4. In 1848 the Pope was one of the temporal rulers in Europe; in 1920 he was only the head of a great church.
5. In 1750 few people in Europe were nationalistic; in 1920 there were few people in Europe who were not nationalistic.

"When pupils are able to explain the facts listed above in the light of the understanding resulting from their study of the development of nationality the evidence indicates that the learning outcome sought from the unit, in so far as it relates to a grasp of the relationship between the past and the present, has been reasonably well attained."¹⁴

Grade—High School. English Literature

Learning product to be tested: understanding.

Specific learning product: to understand the motives of the characters in the play entitled *Julius Caesar*.

¹³Howard C. Hill, "The Use of Tests in the Teaching of the Social Studies"; *The Historical Outlook*, 20 (January, 1929), 8. (Quoted with permission of the publisher.)

¹⁴*Ibid.*, p. 8.

JULIUS CAESAR¹⁶

1. Caesar was great in the following capacities:
 - a. As general
 - b. As orator
 - c. As scientist
 - d. As statesman
 - e. As educator
 - f. As historian
2. The plot to kill Caesar was first conceived by Brutus, Casca, Cassius, Cinna.
3. The particular purpose in introducing Caesar's ghost is
 - a. To lend dramatic interest to performance
 - b. To emphasize Brutus's sense of guilt
 - c. To make character interest conform to that of other plays of the time
4. Cassius was more callous to the results of the conspiracy than Brutus because
 - a. He admired Caesar less
 - b. He was coarser-grained
 - c. He considered personal aggrandizement more than Brutus did
5. The following characters are important to the development of the plot of the play: Casca, Varro, Caesar, Antonius, Brutus, Portia, Publius, Lepidus.
6. Caesar opposed the Roman senate because
 - a. He desired to become emperor
 - b. He saw a decline in the power of Rome under existing governmental conditions
 - c. His chief end was to glorify himself
7. The following are important to the development of the plot of the play:
 - a. The conference of the conspirators on the procedure of making public the reasons for Caesar's death
 - b. Antony's plot against Lepidus after the great Forum scene
 - c. Portia's claim to know what preys on Brutus's mind
 - d. The conspirator's plan to commit Brutus
 - e. The scene where Brutus and Cassius say their farewells
 - f. The scene between the tribunes and the cobbler
8. Brutus and Cassius
 - a. Had the same purpose in entering the conspiracy
 - b. Had different purposes in entering the conspiracy

¹⁶F. C. Touton and Alice Struthers, *Junior High School Procedure*, p. 191. Boston: Ginn and Company, 1926. (Quoted with permission of the publisher.)

c. Tests focussed upon the learning product **personal acceptance of worth and value**. The content of these tests provides situations where the pupil is permitted to indicate his preference or to act as he thinks best. For example, if the learning product be to recognize and accept what is a good breakfast for a pupil in the sixth grade then the pupil should be permitted to indicate his preference or actually to select the breakfast. If the learning product be to have an intelligent attitude upon what makes a city a good city in which to live then the pupil should be permitted to indicate his viewpoint through a selection of things characteristic of good cities. If the learning product be to recognize the beauty of phrasing then the pupil should be permitted to indicate phrases that he considers to be beautiful in their expression.

Examples are presented in: citizenship, hygiene, civics, and English.

Grade II. Citizenship

Learning product to be tested: personal acceptance of worth and value.

Specific learning product: to accept and to respond to the value of street-crossing signs.

Here is a sign that you often see. Read what things are asked about it. Write the correct answer. Then put a cross before each wrong answer.¹⁸

STOP! LOOK! LISTEN!

1. Where do you see this sign?
.....in a store.
.....at a park.
.....at a railroad crossing.
2. When might it save a life?
.....when a train has gone past.
.....when a train is coming.

¹⁸C. J. Anderson and Isobel Davidson, *Reading Objectives*, p. 345. New York: Laurel Book Company, 1925. (Quoted with permission of the publisher.)

3. Why should the words be in this order?
-because some one wrote them that way.
 -because they look better that way.
 -because it is better to stop, look up and down the track, and listen for a train that you do not see.

Grade V. Citizenship

Learning product to be tested: personal acceptance of worth and value.

Specific learning product: to have an intelligent viewpoint toward certain acts of citizenship.

The qualities and characteristics involved in the correct answers may be inherent in the pupil but they are developed only after a period of growth and training in a study of what constitutes good acts of citizenship. Such growth and training will necessarily bring about a new viewpoint in the pupil's thinking. It is this new viewpoint, this transformation of meaning, this personal acceptance of worth and value, that the test endeavors to measure.

CITIZENSHIP¹⁷

1. A boy sees two other boys fighting:
 - a. He should urge them on
 - b. He should try to separate them
 - c. He should stand by and watch them
 - d. He should report it to the principal
2. Good sportsmanship means:
 - a. Being a good loser and modest winner
 - b. Discourteousness to opponents
 - c. Respectful attitude toward the umpire
3. A thrifty pupil:
 - a. Uses all of his school time wisely
 - b. Uses paper economically
 - c. Respects the time of others
 - d. Saves his money

¹⁷A. S. Gist and W. A. King, *The Teaching and Supervision of Reading*, p. 194. New York: Charles Scribner's Sons, 1927. (Quoted with permission of the publisher.)

4. A dependable pupil:
 - a. Can be trusted when he is not being watched
 - b. Tries his best
 - c. Rarely asks for help
 - d. Always tells the truth
5. An excellent citizen at school:
 - a. Never fights
 - b. Obeys all rules
 - c. Always tries to make his school better
 - d. Is polite to the teachers
6. A pupil tries to copy from your paper in examination:
 - a. You should try to prevent it
 - b. You should inform the teacher
 - c. You should permit him to do it
7. You accidentally knock bundles from a woman crossing the street:
 - a. You should ask her pardon
 - b. You should step quickly away
 - c. You should assist her in picking up her parcels
8. If a boy has a seat on a street car and sees an elderly woman and a young woman standing:
 - a. He should offer his seat to the elderly woman
 - b. He should offer his seat to the younger woman
 - c. He should keep his seat and pretend not to notice them

Grade VI. Hygiene

Learning product to be tested: personal acceptance of worth and value.

Specific learning product: to accept personally what is a good breakfast.

In order for a pupil to make an intelligent choice he must recognize the worth of each kind of food relative to his needs. Such a recognition of worth is usually developed through study and training that produce a transformation of meaning as to what constitutes a good breakfast.

HYGIENE¹⁸

Directions. Select the best breakfast from the four breakfasts given below.

My choice is breakfast number

- | | | |
|----|-----------------------------|-----------|
| 1. | Orange juice | |
| | Wheat biscuit | |
| | Toast | Coffee |
| 2. | Baked apple | |
| | Poached egg | Toast |
| | Milk | |
| 3. | Corn or rice flakes | |
| | Pancakes and sausages | |
| | Toast | Milk |
| 4. | Prunes | |
| | Hot wheat cereal and butter | |
| | Milk | Doughnuts |

Grade VIII. Civics

Learning product to be tested: personal acceptance of worth and value.

Specific learning product: to have an intelligent viewpoint concerning what makes a city a good city in which to live.

In order to make an intelligent selection in the test the pupil must have studied and viewed the problem from many different angles. Very probably this study would bring about a change in his point of view. It is this change, this transformation of meaning, this personal acceptance of worth and value, that the test seeks to measure.

A GOOD CITY¹⁹

Place the letter (X) before the ten things in this list that you consider the most important in making a city a good city in which to live.

- 1. street signs
 2. number of department stores

¹⁸The author is indebted to Mae Weber Palmer for contributing this test.

¹⁹C. E. Greene, *New Type Tests*, Denver Public Schools Research Monograph, No. 3. Denver: Denver Public Schools, 1926. (Quoted with permission of the author.)

- 3. death rate
- 4. condition of railroad stations
- 5. cost of education per pupil
- 6. number of manufacturing concerns
- 7. annual losses by fire
- 8. care of street crossings
- 9. increase of population
- 10. amount of park and playgrounds space
- 11. number of churches
- 12. number of schools
- 13. number of social organizations
- 14. character of city newspapers
- 15. cost of city government per inhabitant
- 16. number of building inspectors
- 17. area of the city
- 18. efficiency of the street railways, gas and electric lighting,
and telephone service
- 19. proportion of single, double, and tenement houses
- 20. number of motion-picture houses

Grade—High school. English

Learning product to be tested: personal acceptance of worth and value.

Specific learning product: to have an intelligent viewpoint toward the sort of things that poetry might inspire one to do or be.

This viewpoint comes to a pupil after deliberation and thinking. Reflection on what poetry might inspire one to do, or be, should result in a new viewpoint toward poetry. It is this transformation of meaning, this new way of behaving, this personal acceptance of worth and value, that the test seeks to measure.

POETIC INSPIRATION²⁰

Directions: Below is a list of fifteen phrases which express the sort of things which poetry might inspire the reader to do or to be.

Following this list of phrases are five poems. Read the poems

²⁰G. M. Ruch, *The Improvement of the Written Examination*, p. 88. New York: Scott, Foresman and Company, 1924. (Quoted with permission of the publisher.)

and then mark in the square at the right of each poem, the number of the one phrase which you think best expresses what that passage would inspire the reader to do or to be.

1. Serve his country
2. Live a pure life
3. Treat others kindly
4. Endure trouble patiently
5. Avoid boasting
6. Stand by his principles
7. Serve other people
8. Tell the truth
9. Play fairly
10. Admire beauty
11. Serve God
12. Meet difficulties bravely
13. Work faithfully
14. Search for knowledge
15. Follow a leader loyally

Selection I.

Then out spake brave Horatius,
The captain of the gate,
"To every man upon this earth
Death cometh soon or late.
And how can man die better
Than facing fearful odds
For the ashes of his fathers
And the temples of his gods?"

☐

Selection II.

Now I had done a braver thing
Than all the worthies did;
From thence a braver yet doth spring,
Which is to keep that hid.

☐

Selection III.

It matters not how strait the gate,
How charged with punishments the scroll,
I am the master of my fate;
I am the captain of my soul.

☐

Selection IV.

Round the cape of a sudden came the sea,
 And the sun look'd over the mountain's rim;
 And straight was a path of gold for him,
 And the need of a world of men for me.



Selection V.

Yet remember all
 He spoke among you, and the men who spoke;
 Who never told the truth to serve the hour
 Nor paltered with Eternal God for power;



Grade—High school. English

Learning product to be tested: personal acceptance of worth and value.

Specific learning product: to accept beauty of phrasing.

In order to make intelligent selection of beautiful phrases the pupil must personally accept what is of worth and value in making language beautiful. Such acceptance must be built up, through study and training, as a definite learning product, as a transformation of meaning. It is this learning product, this personal acceptance, that the test endeavors to measure.

APPRECIATION OF THE BEAUTY OF PHRASING²¹

Directions. Below are fifteen selections from prose and poetry. Read them all and then mark an (x) in the square at the right of the five that contain the most beautiful language. Remember, mark five and only five.

Selection I.

Like an armed warrior, like a plumed knight,
 James G. Blaine marched down the halls of the
 American Congress and threw his shining lances
 full and fair against the brazen foreheads of
 every defamer of his country and maligner of
 its honor.



²¹*Ibid.*, p. 86. (Quoted with permission of the publisher.)

Selection II.

We see dimly in the present what is small and
what is great.



Selection III.

Take her up tenderly,
Lift her with care,
Fashioned so slenderly,
Young and so fair!



Selection IV.

The strong gods pine for my abode,
And pine in vain the sacred Seven
But thou, meek lover of the good,
Find me, and turn thy back on heaven.



Selection V.

Not poppy nor mandragora
Nor all the drowsy syrups of the world.



Selection VI.

And with such a sign as the caves of hell
sighed when the incestuous mother uttered the
abhorred name of Death, the sound was re-
verberated—everlasting farewells! and again,
and yet again reverberated—everlasting fare-
wells!



Selection VII.

O to be in England
Now that April's there.



Selection VIII.

Roll on, thou deep and dark blue Ocean, roll;
Ten thousand fleets sweep over thee in vain.



Selection IX.

With deep affection,
And recollection,
I often think of
Those Shandon bells.

☐

Selection X.

She was dead. Dear, gentle, patient, noble
Nell was dead.

☐

Selection XI.

How can we elevate our history of retribution
for sins of long ago when, as one of our most
prominent figures, we are compelled to intro-
duce. [Sic]

☐

Selection XII.

Thou still unravished bride of quietness,
Thou foster child of Silence and Slow Time.

☐

Selection XIII.

Breathes there the man with soul so dead
Who never to himself hath said,
This is my own, my native land.

☐

Selection XIV.

And thro' the moss the ivies creep,
And in the stream the long-leaved flowers weep,
And from the craggy ledge the poppy hangs in
sleep.

☐

Selection XV.

Character is higher than intellect. Thinking
is the function. Living is the functionary.

☐

Summary. The purpose of a test is to secure evidence from which one may infer the presence or absence of the learning product. Evidence of the presence or absence of the learning

product may be secured by means of the exploratory test and the attainment test. The basic principle in test construction is that the test must be focussed directly upon the learning product. This becomes, then, one of the practices in the Learning-Product Technique: to secure evidence from which one may infer the presence of the learning product.

SUGGESTIONS AND STUDY HELPS

1. Prepare test questions to illustrate the five types of questions mentioned on page 171.
2. Select a learning product consisting of ability to do. Prepare a test focussing the questions upon this learning product.
3. Select a learning product of understanding. Prepare a test focussing the questions upon this learning product.
4. Select a learning product of personal acceptance of worth and value. Prepare a test focussing the questions upon this learning product.
5. How did you decide what type of questions to use?
6. Could the same test be given as an exploratory test and as an attainment test?
7. Why should the test questions be focussed upon the learning product and not upon the learning material?
8. What grade do you give a pupil who has not attained the learning product?

HELPFUL REFERENCES

- GIST, A. S., and KING, W. A., *The Teaching and Supervision of Reading*, Ch. IX. New York: Charles Scribner's Sons, 1927
- PATERSON, D. G., *The Use of New Type Examinations*. Yonkers-on-Hudson: World Book Company, 1925
- RUCH, G. M., *The Improvement of the Written Examination*. New York: Scott, Foresman and Company, 1924
- RUSSELL, CHARLES, *Classroom Tests*. Boston: Ginn and Company, 1926
- STORMZAND, M. J., *Progressive Methods in Teaching*, Ch. XI. Boston: Houghton Mifflin Company, 1924
- TOUTON, F. C., and STRUTHERS, ALICE, *Junior High School Procedure*. Boston: Ginn and Company, 1926

X

DIAGNOSING THE PUPIL'S DIFFICULTIES

The importance of diagnosis. Records of achievement and school progress show that large numbers of boys and girls fail each year to make normal progress in their school work. It is evident that for some reason the usual type of classroom instruction failed to give such pupils the specific help they needed. Investigation of reasons why pupils fail has shown that failing pupils can be helped. It is apparent, therefore, that one of the important responsibilities that the teacher must assume is diagnosis of the cause of failure with application of proper remedial instruction.

What diagnosis is. Diagnosis is not a strange, mysterious device, but simply means locating the difficulties in the pupil's learning and the cause of the errors in the pupil's work. When such difficulties are located and when the cause of error is found, proper remedial instruction must be applied at the points of difficulty and error.

All methods of diagnosis call for some form of observation or testing. The results of the test or observation should be used solely as a basis for remedial instruction. The pupil's responses and reactions should yield information that may be used by the pupil to overcome his difficulties and to eliminate his errors. Diagnosis implies a clear understanding on the part of the teacher of just *how* the pupil did his work and what difficulties he encountered. A low score on a test is not the cause of failure. It is merely evidence that the learning product has not been attained. What caused the low score can be determined only through a careful diagnosis, or interpretation, of all the factors entering into and influencing the learning process.

Guiding principles of diagnosis. There are five important principles that underlie all diagnosis whether it be group or individual. The guiding principles are these:

a. There should be learning products set up in terms of ways of behaving to be attained.

b. There should be knowledge of the factors that condition learning.

c. There should be a detailed study of the problem pupil to discover the cause of his difficulty and error.

d. There should be remedial instruction applied at the points of difficulty and error.

e. There should be a record of the pupil's progress toward attainment of the learning products.

Each of these guiding principles is discussed at greater length in the pages immediately following.

a. Learning products set up. All learning is a self-active process on the part of the learner and should result in a change, a transformation of processes, a new way of behaving. This change, this new way of behaving, is properly called a learning product and should be set up in terms of self-actuated pupil activities. It follows, therefore, that one of the guiding principles in diagnosis is to ascertain if learning products have been set up and attained by the pupil. Difficulties in a pupil's progress can be diagnosed only if definite and specific learning products have been set up to be attained.

b. Factors that condition learning. There are certain factors that are causative in conditioning the learning of the pupil. Some of these factors are found in the pupil's previous education, some in his methods of work and study, some in his traits of personality, and others in his mental, physical, and environmental conditions. These conditioning factors of learning may be briefly outlined as follows:

1. *Deficiencies in education.* A pupil's difficulties in learning may be caused by some deficiency in his education. Such a deficiency may be due to a lack of sequence in his previous education caused through absence, illness, change of schools, or similar reasons; the pupil's command of oral or written English may be below the standards required for success in his grade; or there may be an inability to read effectively either as regards rate of reading or comprehension of what is read. Anderson¹ reports the case of a pupil in grade IV who was failing because she was attempting to read material far beyond her comprehension. When the case was correctly diagnosed and the proper remedial instruction was applied, improvement in the comprehension of her reading was rapid.

2. *Poor methods of work and study.* A pupil may be failing because of poor methods of work and study. Without proper training some pupils are not able to use their time wisely, to give sustained attention, or to pay proper attention to details that are essential for attainment of the learning products. Reavis² reports the case of a boy in grade X who was failing in English because of indifference to matters of form and detail in his composition work. His work in his other studies was also unsatisfactory because of his poor habits in English. Through proper guidance his class work improved until he was doing satisfactory work.

3. *Mental disabilities.* Low mentality, or special mental disability due to injury, will be revealed in the character of the work done by the pupil. Gray³ reports the case of a boy who was failing in grade VIII reading. Diagnosis revealed that the boy was retarded three years mentally. The retardation showed in his lack of imagination and lack of appreciation

¹See Chapter XII, p. 259.

²See Chapter XII, p. 247.

³See Chapter XII, p. 262.

of meanings. The boy was also handicapped by a narrow background of experience and a limited meaning vocabulary. Instruction adapted to his needs and to his mental ability prevented his total failure in reading.

4. *Environmental conditions.* A pupil's environmental conditions are often causative in producing success or failure. Among those conditions which oftentimes produce failure in school work are foreign parentage, unfavorable home and neighborhood conditions, and the conflict between the ideals and customs of the home and the school. Geiger⁴ reports the case of a girl in grade III who was failing in reading. The cause of failure was diagnosed as foreign parentage which produced difficulties in English and subsequent errors in reading. These errors, in turn, resulted in faulty ideas and a low comprehension score.

5. *Difficulties due to personality traits.* A pupil's personality traits may give rise to situations which, in turn, cause difficulties in the learning process. Among these traits of personality that cause difficulty are:

(a) The pupil's emotional reactions such as being pessimistic, impatient, irritable, or deceitful. Such emotional reactions may present difficulties in learning that will yield only to careful diagnosis and individual treatment of the case.

(b) The pupil's will-temperament traits, representing his voluntary reactions to his surroundings. Reactions that oftentimes cause difficulty in learning are those of being slow, careless, weak, or vacillating.

(c) The pupil's nonsocial qualities such as being selfish, noncoöperative, or solitary. These qualities usually will increase his learning difficulties.

⁴See Chapter XII, p. 256.

Van Alstyne⁵ reports the case of a boy, aged 12, with an I. Q. of 152 who was failing in handwriting. A diagnosis revealed the boy to be emotionally unstable and self-willed and as having poor motor control. Proper training along motor activity lines with supervision of his play, food, and sleep helped him to gain control of his handwriting.

6. *Physical disabilities.* These include malnutrition, physical ailments, and physical handicaps. They are evidenced in poor health, lack of initiative due to late hours, absence occasioned by illness or accident, foreign accent, and defects of the sensory organs. Monroe⁶ reports the case of a girl eighteen and one-half years old, in grade X, who was failing in ancient history. She was afflicted with nervousness due to a fall from a horse. This nervousness affected her study habits until she was on the verge of failing. Remedial instruction with training in how to study partly overcame her physical handicap.

7. *Difficulties due to psychophysical disabilities.* The modern city environment produces an accumulative and massed effect of noises, lights, and nervous tension that is detrimental to the central nervous system. All such cases should be referred to a specialist in nervous disorders.

c. *Study of the pupil.* A detailed study of the pupil as he works should be made to discover the cause of his difficulties and errors. All learning is individual. The difficulties, the errors, the progress made toward attainment of the learning products are individual matters with each pupil. Diagnostic testing and remedial instruction, therefore, must be individualized as much as possible. Because of the great extent of individual differences the same explanation, the

⁵See Chapter XII, p. 255.

⁶See Chapter XII, p. 245.

same drill, the same instruction will not result in the same progress nor degree of attainment for all pupils. Pupils often have individual difficulties that remain uncorrected when group diagnosis with remedial instruction for certain errors has been applied. This is because difficulties that appear to be similar are, in a large number of cases, really due to widely different causes and hence demand different treatment. It is not sufficient that group errors be diagnosed and eliminated. The special difficulties, errors, and lack of progress of *each pupil* must be diagnosed with proper remedial instruction applied at the point of difficulty and error. In order to do this, the teacher should endeavor to find out just how the pupil works when he is working independently. The explanation of much poor work lies in the method that the pupil uses as he studies. This makes it imperative that the teacher make a complete and systematic analysis of the habits of work of the problem pupil who is having continued difficulty in a given subject. The incorrect habits of work and the difficulties encountered in the learning activities of the problem pupil should be entered on a diagnostic chart.

Three examples of diagnostic charts, for illustrative purposes, follow.

1. *Arithmetic*. A diagnostic chart for arithmetic, the Buswell Diagnostic Chart for Individual Differences in the Fundamental Processes in Arithmetic, is shown in Fig. 1. Similar charts are available for subtraction, multiplication, and division. As the pupil works, the teacher checks on the chart the habits observed and the procedure of the pupil. This diagnostic chart is self-explanatory and gives both the pupil and teacher a clear knowledge of the specific things which are causing difficulty in the pupil's work.

DIAGNOSTIC CHART

FOR.

INDIVIDUAL DIFFICULTIES

FUNDAMENTAL PROCESSES IN ARITHMETIC

Prepared by G. T. Buswell and Lenore John

Name John Dix School Lincoln Grade IV Age 10 to 98
 Date of Diagnosis: Add. 4-7-25; Subt. _____; Mult. _____; Div. _____
 Teacher's preliminary diagnosis slow and inaccurate in fundamental operations

ADDITION: (Place a check before each habit observed in the pupil's work)

- | | |
|--|---|
| <input checked="" type="checkbox"/> a1 Made errors in combinations | <input type="checkbox"/> a18 Dropped back one or more decades |
| <input checked="" type="checkbox"/> a2 Counted | <input checked="" type="checkbox"/> a19 Derived unknown combination from familiar one |
| <input type="checkbox"/> a3 Added carried number last | <input type="checkbox"/> a20 Disregarded one column |
| <input checked="" type="checkbox"/> a4 Forgot to add carried number | <input checked="" type="checkbox"/> a21 Made error in writing answer |
| <input type="checkbox"/> a5 Retraced work after partly done | <input type="checkbox"/> a22 Skipped one or more decades |
| <input type="checkbox"/> a6 Added carried number irregularly | <input type="checkbox"/> a23 Carried when there was nothing to carry |
| <input type="checkbox"/> a7 Wrote number to be carried | <input type="checkbox"/> a24 Used scratch paper |
| <input checked="" type="checkbox"/> a8 Carried wrong number | <input type="checkbox"/> a25 Added in pairs, giving last sum as answer |
| <input type="checkbox"/> a9 Proceeded irregularly in column | <input type="checkbox"/> a26 Added same digit in two columns |
| <input type="checkbox"/> a10 Grouped two or more numbers | <input type="checkbox"/> a27 Wrote carried number in answer |
| <input type="checkbox"/> a11 Split numbers | <input type="checkbox"/> a28 Added same number twice |
| <input checked="" type="checkbox"/> a12 Used wrong fundamental operation | <input type="checkbox"/> a29 Began with left column |
| <input type="checkbox"/> a13 Lost place in column | <input type="checkbox"/> a30 Confused columns |
| <input type="checkbox"/> a14 Depended on visualization | <input type="checkbox"/> a31 Added carried number twice |
| <input type="checkbox"/> a15 Disregarded column position | <input type="checkbox"/> a32 Subtracted carried number |
| <input type="checkbox"/> a16 Omitted one or more digits | <input type="checkbox"/> a33 Added imaginary column |
| <input type="checkbox"/> a17 Made errors in reading numbers | |

Habits not listed above _____

(Write observation notes on pupil's work in space opposite examples)

(1)	$\begin{array}{r} 5 \\ 2 \\ \hline 7 \end{array}$	$\begin{array}{r} 6 \\ 3 \\ \hline 9 \end{array}$	Correct	(5)	$\begin{array}{r} 6+2=12 \\ 3+4=12 \end{array}$	Multipled instead of Added (Habit # 12)
(2)	$\begin{array}{r} 2 \\ 9 \\ \hline 11 \end{array}$	$\begin{array}{r} 8 \\ 4 \\ \hline 13 \end{array}$	Error in combination (Habit # 1)	(6)	$\begin{array}{r} 52 \\ 13 \\ \hline 65 \end{array}$	$\begin{array}{r} 40 \\ 39 \\ \hline 79 \end{array}$ Correct
(3)	$\begin{array}{r} 12 \\ 2 \\ \hline 14 \end{array}$	$\begin{array}{r} 13 \\ 5 \\ \hline 18 \end{array}$	"13 and 5 are - 10 and 5 are 15, 11 and 5 are 16, 12 and 5 are 17, 13 and 5 are 18." (Habit # 19)	(7)	$\begin{array}{r} 78 \\ 71 \\ \hline 149 \end{array}$	$\begin{array}{r} 46 \\ 92 \\ \hline 38 \end{array}$ "6 and 2 are 8, 9 and 4 are 13." Error in writing answer, omitted the "1" in 13 (Habit # 21)
(4)	$\begin{array}{r} 19 \\ 2 \\ \hline 11 \end{array}$	$\begin{array}{r} 17 \\ 9 \\ \hline 71 \end{array}$	"9+2 is 11, bring down the 1" (Habit # 4) "1 and 9 is 10, 6 and 1 is 7" Carried wrong number (Habit # 8)	(8)	$\begin{array}{r} 3 \\ 5 \\ 8 \\ 2 \\ \hline 18 \end{array}$	$\begin{array}{r} 8 \\ 7 \\ 9 \\ \hline 31 \end{array}$ Counted on fingers. Said "8 and 7 are 15, and 9 are 16, 17, 18, 19, 20, 21, 22, 23, 24, and 7 are - 25, 26, 27, 28, 29, 30, 31." Touched one finger for each count (Habit # 2)

FIGURE 17

7G. T. Buswell and Lenore John, *Diagnostic Studies in Arithmetic*, University of Chicago Supplementary Educational Monographs, No. 30, p. 156. Chicago: University of Chicago Press, 1926. (Used with permission of the publisher.)

2. *Reading.* A diagnostic chart as an aid in determining the difficulties of a pupil in reading has been devised by Gray. It is reproduced in Table XXXII.

TABLE XXXII.⁸

DIAGNOSTIC SHEET	THIS PUPIL
I. Rate of Oral Reading	
1. Lack of Assimilative Power.....	X
2. Slow Rate of Vocalization.....	
3. Lack of Familiarity with Language Forms.....	X
4. Short Span of Perception.....	X
5. Too Great Dependence upon Objective Cues.....	
6. Overcare.....	
II. Rate of Silent Reading	
1. Faulty Eye-Movement.....	
2. Lack of Assimilative Power.....	X
3. Large Amount of Vocalization.....	
4. Lack of Familiarity with Language Forms.....	X
5. Short Span of Perception.....	X
6. Overcare.....	
7. Lack of Effort.....	
III. Omissions in Oral Reading	
1. Fields of Perception Do Not Overlap.....	
2. Reading from Context.....	
3. Fluctuations of Attention.....	X
IV. Repetitions in Oral Reading	
1. Habitual.....	X
2. Dissatisfaction with First Attempt.....	
3. Too Great Overlapping in the Fields of Perception.....	
V. Insertions in Oral Reading	
1. Reading from Context.....	
2. Fluctuations of Attention.....	X
3. Apperceptive Processes Too Active.....	
VI. Mispronunciation in Oral Reading	
1. Faulty Perception.....	
2. Lack of Familiarity with Language Forms.....	
3. Special Defects.....	
4. Apperceptive Processes Too Active.....	
VII. Substitution in Oral Reading	
1. Reading from Context.....	
2. Faulty Perception.....	X
3. Apperceptive Processes Too Active.....	

⁸C. T. Gray, *Deficiencies in Reading*, p. 348. New York: D. C. Heath and Company, 1922. (Quoted with permission of the publisher.)

TABLE XXXII.—(*Continued*)

DIAGNOSTIC SHEET	THIS PUPIL
VIII. Quality of Oral Reading	
1. Failure to Appreciate Language Relations.....	X
2. Lack of Training.....	
3. Slow Assimilation.....	X
IX. Comprehension	
1. Slow Assimilative Power.....	X
2. Failure to Evaluate Different Ideas.....	
3. Poor Motor Adjustments.....	
4. Short Span of Perception.....	X
5. Lack of Language Ability.....	
6. Lack of Synthetic Ability.....	
7. Lack of Analytic Ability.....	
X. Faulty Eye-Movements	
1. Short Span of Perception.....	X
2. Periods of Confusion.....	X
3. Poor Motor Adjustments.....	
XI. Breathing	
1. Nervousness.....	
2. Poor Motor Coördination.....	
3. Habitual.....	
4. Lack of Training.....	
XII. Rate of Vocalization	
1. Slow Reaction Time.....	
2. Lack of Familiarity with Language Forms.....	X
XIII. Amount of Vocalization	
1. Habitual.....	
2. Accompaniment of Meaning.....	
XIV. Extraneous Movements	
1. Nervousness.....	
2. Habitual.....	
3. Lack of Adjustment to Reading Situation.....	
XV. Vocal Movements	
1. Habitual.....	
2. Defects in Speaking Parts.....	
XVI. Span of Perception	
1. Faulty Training.....	
2. Slow Assimilation.....	X
3. Low Level of Attention.....	
XVII. Voice-Eye Span	
1. Faulty Training.....	
2. Slow Assimilation.....	X
3. Low Level of Attention.....	

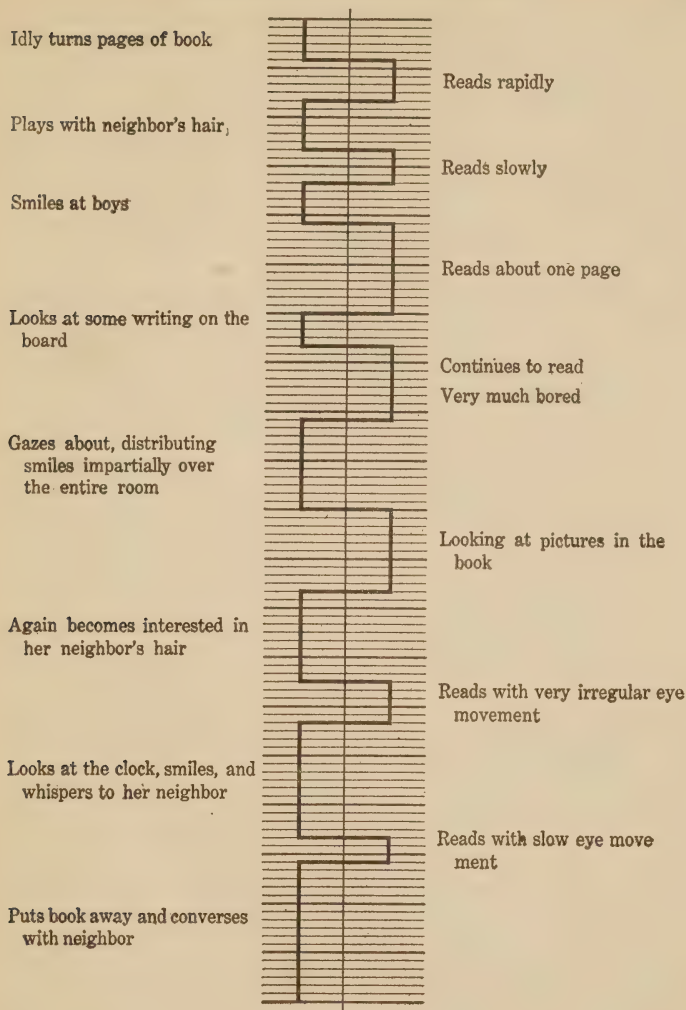
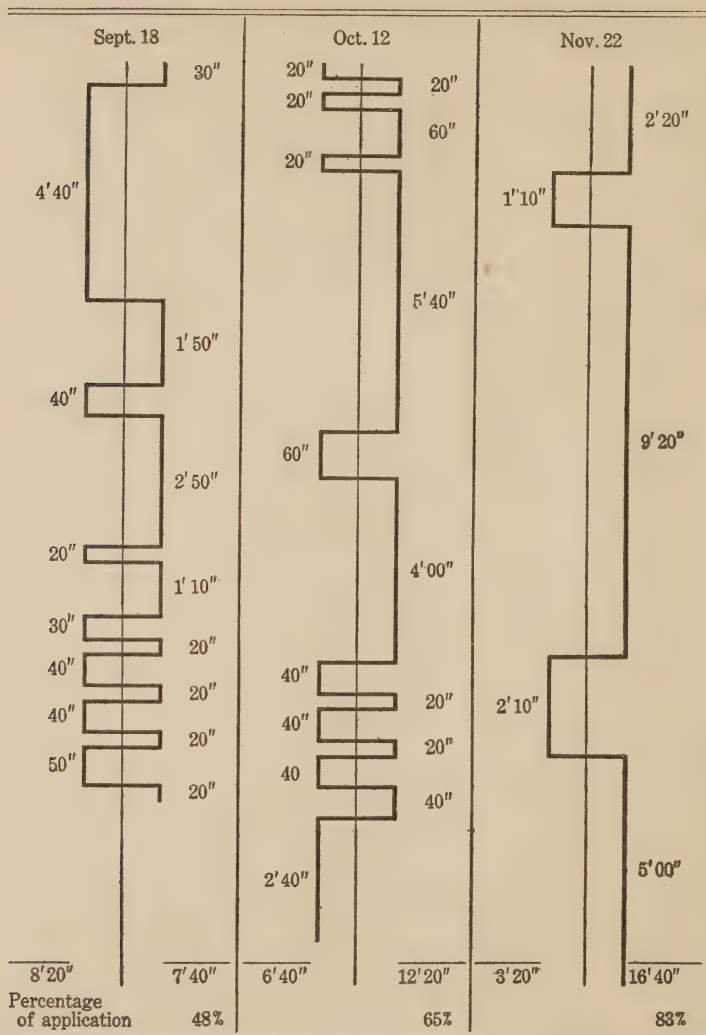


FIGURE 2⁹

⁹H. C. Morrison, *The Practice of Teaching in the Secondary School*, p. 137. Chicago: University of Chicago Press, 1926. (Used with permission of the publisher.)

FIGURE 3¹⁰

¹⁰*Ibid.*, p. 139. (Used with permission of the publisher.)

3. *Sustained application in study.* In diagnosing the causes of inattention, Morrison has found the sustained Application Profile to be useful. A reproduction of a sustained application profile is shown in Fig. 2.

The column to the right of the heavy vertical line stands for application; the column to the left stands for distraction. The spaces marked off by the horizontal lines are time intervals. The light horizontal lines mark off spaces of ten seconds each, and the heavy horizontal lines mark off minutes.

In making a record, the teacher should find a position in which she can clearly watch the pupil as he works. The time for the various periods of application and distraction are then noted and recorded.

The sustained application profile shown in Fig. 2 was made of a girl in grade VIII. The observation lasted twenty minutes.

The result of training following the making of a sustained application profile is shown in Fig. 3.

The profiles shown in Fig. 3 show the percentage of sustained application rising from 48 per cent on September 18th to 83 per cent on November 22d. This pupil was a boy in junior high school.

d. Remedial instruction.¹¹ After the difficulties and errors of the pupil have been ascertained they can be eliminated through the application of the proper remedial instruction. All remedial instruction should be applied at the points of difficulty and error.

The value of applying remedial instruction to the point of error has been shown by France and Stevenson in arithmetic. Two VIIB classes with enrollment of forty-five pupils were given a series of tests in arithmetic. The type errors revealed were:¹²

¹¹See Chapters XI and XII for a more complete treatment of remedial instruction.

¹²O. C. France and P. R. Stevenson, "Remedial Instruction in Arithmetic"; *Educational Research Bulletin*, Ohio State University, 2 (November 14, 1923), 291. (Data used with permission of the publisher.)

	PER CENT OF PUPILS
1. Division of a four-digit number by a one-digit number.....	67
2. Difficulty in dividing decimal fractions.....	90
3. Could not multiply fractions.....	40
4. Could neither add nor subtract fractions.....	78
5. Made mistakes in multiplying a four-digit number by a two-digit number.....	89
6. Error in dividing a three-or-more-digit number by a two-digit number.....	62
7. Difficulty in subtraction of a three-digit number from a three-or-more-digit number.....	42
8. Did not know zero combinations.....	40
9. Failed to get correct sums in adding five four-digit numbers.....	73

Remedial instruction was applied to the point of error as follows:

Seventy-eight per cent of the class made errors in addition and subtraction of fractions. The first ten minutes of the arithmetic period were devoted to this topic. The errors were pointed out; illustrative examples were solved and explained by the teacher. The pupils were drilled on similar exercises, and certain pupils were given individual instruction. This type of remedial instruction was continued until the process of adding and subtracting fractions became habitual. Similar types of remedial instruction were applied to the various errors. The gain resulting at the end of the semester is shown in Table XXXIII.

All pupils do not have the same difficulties and so do not need the same kind nor amount of remedial instruction. After the individual needs of the pupil have been determined, then and only then can remedial instruction appropriate for each pupil be applied.

TABLE XXXIII.—AVERAGE SCORES ON THE DIFFERENT PARTS OF THE MONROE SURVEY SCALE¹³

TYPE OF PUPIL	ADDITION		MULTI- PLICATION		DIVISION		SUBTRAC- TION		ADD. AND SUBTRAC- TION OF FRAC- TIONS		MULT. AND DIVISION OF FRAC- TIONS		DECIMAL FRAC- TIONS	
	TRIAL		TRIAL		TRIAL		TRIAL		TRIAL		TRIAL		TRIAL	
	I	2	I	2	I	2	I	2	I	2	I	2	I	2
Ten brightest	4.1	5.3	3.3	5.6	2.2	2.7	4.8	7.1	2.0	10.4	4.2	9.2	1.3	12.4
Ten dullest	3.5	5.6	1.5	4.3	1.3	3.5	4.3	7.1	0.3	7.1	4.6	11.3	0.	7.7
Entire class	4.0	5.5	2.2	4.9	1.7	2.9	4.6	7.1	0.9	7.9	5.0	10.2	0.8	9.5

e. Record of the pupil's progress. There should be a record of the pupil's progress toward attainment of the learning products. Experimental studies have shown that definite knowledge of one's progress facilitates attainment of the learning product.¹⁴ Teachers should use progress charts to motivate the pupil's work. Such progress charts should show the learning product, the pupil's initial status or score, and the extent of progress score. For a more complete treatment of the value and use of progress charts the reader is referred to Chapter XIII.

Summary. Diagnosis is a study of the pupil as he works with an analysis of his difficulties and errors encountered in attainment of the learning products. All diagnosis is a form of testing and may be applied to a group or to an individual. In either case, the purpose of the diagnosis is to gain some knowledge that will help the pupil in his progress toward attainment of the learning products. This becomes, then, one of the practices in the Learning-Product Technique: to diagnose the pupil's difficulties and errors and to apply remedial instruction at the points of difficulty and error.

¹³See Chapter XIII, p. 270.

¹⁴*Ibid.*, p. 296. (Quoted with permission of the publisher.)

SUGGESTIONS AND STUDY HELPS

1. Select some class you are teaching. Make a list of factors that are contributing toward failure. For example, (a) difficulties in reading; (b) poor study habits; (c) mental disabilities; (d) environmental conditions; (e) personality; (f) physical disabilities; and (g) nervousness.
2. Make a list of type errors in some particular subject. Arrange in tabular form showing percentages.
3. Select a slow working pupil and study him as he works in some particular subject. Tabulate your findings as it is done in Figs. 1 and 2 or Table XXXII in this chapter.
4. Do the same with a gifted pupil. What differences do you find?
5. Select some particular class. Locate the type errors. Show in detail how you applied remedial instruction at a point of error.
6. Do the same for a pupil who has been making numerous errors.
7. What are the type errors in one subject that you teach?
8. Explain in detail how you taught to prevent type errors from appearing in your class.

HELPFUL REFERENCES

- BUSWELL, G. T., and JOHN, LENORE, *Diagnostic Studies in Arithmetic*. Chicago: University of Chicago Supplementary Educational Monographs, No. 30, 1926
- GIST, A. S., and KING, W. A., *The Teaching and Supervision of Reading*, New York: Charles Scribner's Sons, 1927
- GRAY, C. T., *Deficiencies in Reading*. New York: D. C. Heath and Company, 1922
- MORRISON, H. C., *The Practice of Teaching in the Secondary School*, Ch. XXVII. Chicago: University of Chicago Press, 1926
- OSBURN, W. J., *Corrective Arithmetic*. New York: Houghton Mifflin Company, 1924
- REAVIS, W. C., *Pupil Adjustment in Junior and Senior High School*. New York: D. C. Heath and Company, 1926

XI

GROUP DIAGNOSIS

One of the important responsibilities of every teacher is diagnosis of the difficulties in the pupil's learning and the cause of error in his work. There are certain difficulties that are common to a given subject. These difficulties yield to remedial instruction that is applied to the points of difficulty and error.

Examples of group diagnosis with remedial instruction applied at the point of difficulty are presented in this chapter. These examples are given merely to help the teacher to see how to direct her thinking as she works among her own pupils. From these examples it is possible to secure helpful suggestions relative to the specific methods used by other teachers in applying group diagnosis in various subjects. The examples include group diagnoses in the following subjects:

1. Arithmetic, grade IV
2. Algebra, high school
3. Composition, grade VI
4. Handwriting, grade VI
5. Punctuation, college freshmen
6. Language, grade VII
7. Reading, grade III
8. Reading, grade IV

Arithmetic—grade IV.¹ The Woody Arithmetic Scale, Series A, was given by Anderson to 35 pupils in grade IV.

a. The test. The Woody Division Scale is a standardized test in division and is shown on page 212.

¹C. J. Anderson, "The Use of the Woody Scale for Diagnostic Purposes"; *Elementary School Journal*, 18 (June 1918), 773. (Data used with permission of the publisher.)

SERIES A

DIVISION SCALE²

BY CLIFFORD WOODY

Name.....

When is your next birthday?..... How old will you be?.....

Are you a boy or girl?..... In what grade are you?.....

$$\begin{array}{llllll} (1) & & (2) & & (3) & & (4) & & (5) & & (6) \\ \overline{3)6} & & \overline{9)27} & & \overline{34)28} & & \overline{1)5} & & \overline{9)36} & & \overline{3)39} \end{array}$$

$$\begin{array}{llllll} (7) & & (8) & & (9) & & (10) & & (11) & & (12) \\ 4 \div 2 = & & \overline{9)0} & & \overline{1)1} & & 6 \times = 30 & & \overline{2)13} & & 2 \div 2 = \end{array}$$

$$\begin{array}{llllll} (13) & & (14) & & (15) & & (16) & & (17) \\ \overline{4)24 \text{ lbs. 8 oz.}} & & \overline{8)5856} & & \frac{1}{4} \text{ of } 128 = & & \overline{68)2108} & & 50 \div 7 = \end{array}$$

$$\begin{array}{llllll} (18) & & (19) & & (20) & & (21) & & (22) \\ \overline{13)65065} & & 24 \div 7 = & & \overline{21.)252.} & & \overline{25)9750} & & \overline{2)1350} \end{array}$$

$$\begin{array}{llllll} (23) & & (24) & & (25) & & (26) \\ \overline{23)469} & & \overline{75)2250300} & & \overline{2400)504000} & & \overline{12)2.76} \end{array}$$

$$\begin{array}{llll} (27) & & (28) & & (29) & & (30) \\ \frac{7}{8} \text{ of } 624 = & & \begin{array}{c} 31.2 \\ \overline{3.)093.6000} \end{array} & & 3\frac{1}{2} \div 9 = & & \frac{3}{4} \div 5 = \end{array}$$

$$\begin{array}{llll} (31) & & (32) & & (33) \\ \frac{5}{4} \div \frac{3}{5} = & & 9\frac{5}{8} \div 3\frac{3}{4} = & & \overline{52)3756} \end{array}$$

$$\begin{array}{llll} (34) & & (35) & & (36) \\ 62.50 \div 1\frac{1}{4} = & & \overline{315)37722} & & \overline{9)69 \text{ lbs. 9 oz.}} \end{array}$$

b. Tabulation of results. The problems which each pupil solved correctly, or incorrectly, are shown in Table XXXIV. The correct problems are marked X, the incorrect O, and the ones not attempted are shown blank.

c. Diagnosis of results. It is evident from a study of Table XXXIV that problems 6, 11, 14, and from 16 on, caused difficulty. The sixth problem is $\overline{3)39}$. Some of the answers

²Published by Teachers College, Columbia University, New York City. (Quoted with permission of the publisher.)

GROUP DIAGNOSIS

213

Number of Questions		Pupils by Number																																			Not Correct	Correct	Distribution of Pupils According to Number Questions Correctly Answered						
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35				36	37	38	39	40	
1.....	1	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	0	Total
2.....	1	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	1	Total	
3.....	1	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	2	Total		
4.....	1	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	3	Total		
5.....	1	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	4	Total			
6.....	1	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	5	Total			
7.....	1	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	6	Total				
8.....	1	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	7	Total					
9.....	1	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	8	Total						
10.....	1	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	9	Total						
11.....	1	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	10	Total							
12.....	1	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	11	Total							
13.....	1	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	12	Total							
14.....	1	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	13	Total							
15.....	1	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	14	Total								
16.....	1	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	15	Total								
17.....	1	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	16	Total								
18.....	1	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	17	Total								
19.....	1	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	18	Total								
20.....	1	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	19	Total								
21.....	1	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	20	Total								
22.....	1	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	21	Total								
23.....	1	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	22	Total								
24.....	1	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	23	Total								
25.....	1	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	24	Total								
26.....	1	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	25	Total								
27.....	1	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	26	Total								
28.....	1	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	27	Total								
29.....	1	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	28	Total								
30.....	1	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	29	Total								
31.....	1	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	30	Total								
32.....	1	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	31	Total								
33.....	1	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	32	Total								
34.....	1	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	33	Total								
35.....	1	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x																					

³C.J. Anderson, "The Use of the Woody Scale for Diagnostic Purposes", *Elementary School Journal*, 18 (June, 1918), 773. (Used with permission of the publisher.)

were 9, $9\frac{3}{12}$, $9\frac{3}{3}$, 10, $10\frac{3}{3}$, $10\frac{4}{3}$, $10\frac{3}{3}$, 12, $12\frac{3}{3}$, $12\frac{3}{3}$, and $14\frac{4}{3}$. It was found that the pupils who gave these answers did not know the tables beyond the nines. Some of the pupils found how many times 3 was contained in 39 as a whole, instead of 3 into 3, and then 3 into 9. One pupil solved the problem as follows:

$$\begin{array}{r} 1 \text{ with 6 remainder} \\ 3 \overline{) 39} \\ \underline{93} \\ 6 \end{array}$$

Another pupil had the following: $3 \overline{) 93}$, showing confusion with multiplication.

Problem 11 is $2 \overline{) 13}$. Several pupils solved as follows: $2 \overline{) 13} \begin{smallmatrix} 5-3 \end{smallmatrix}$ "because 5 times 2 equals 10." They did this because they did not know the multiplication table of sixes.

A summary of the various types of errors follows:

1. Ignorance of the tables, thirty per cent of the errors.

For example, $\begin{smallmatrix} 8106 \\ 8 \overline{) 5856} \end{smallmatrix}$

2. Using the dividend as a whole number made up fourteen per cent of the errors. For example, $\begin{smallmatrix} 12 \text{ and 3 over} \\ 3 \overline{) 39} \end{smallmatrix}$

3. Confusing multiplication and division signs composed fourteen per cent of the errors. For example,

$$\begin{array}{r} 93 \\ 3 \overline{) 39} \end{array} \quad \begin{array}{l} (3 \text{ times 3 instead} \\ \text{of 3 into 3}) \end{array}$$

4. Having trouble with the remainder, ten per cent of all the errors. For example, $2 \overline{) 13} \begin{smallmatrix} 6 \frac{1}{2} \end{smallmatrix}$ (remainder inverted)

5. Confusion of the signs caused seven per cent of the errors. For example, $2 \div 2 = 4$

6. Not being familiar with the form of the problem caused five per cent of the errors. For example, $\frac{1}{4}$ of $128 =$

7. Difficulty in carrying caused five per cent of the errors. For example, $\begin{smallmatrix} 620 \\ 2 \overline{) 1350} \end{smallmatrix}$ (failure to carry 1 making 5 instead of 15)

8. Difficulty with value of zero made up five per cent of the errors. For example, $\frac{0}{1)1}$

9. Miscellaneous errors, ten per cent.

d. Remedial work. The report of the test and diagnosis of results failed to state what remedial work was used to correct the errors.

Algebra—high school.⁴ The Hotz Algebra Scales, Series B, Addition and Subtraction,⁵ were given by Paulu to a pre-normal school (high school) group of 29 students.

a. The test.

$$1. 4r+3r+2r=$$

$$2. 2x+3x=$$

$$3. 12b+6b-3b=$$

$$4. 2c+\frac{1}{2}c=$$

$$5. 7x-x+6-4=$$

$$6. 3a-4b+5a-2b=$$

$$7. 5m+(-4m)=$$

$$8. 20x-(10x+5x)=$$

$$9. (4r-5t)+(s-3r)=$$

$$10. 8c-(-6+3c)=$$

$$11. 3a^2-3b-(2a^2+3b-4)=$$

$$12. 5x-4x-(3x-1)=$$

$$13. \frac{3c}{4}-\frac{3c}{8}=$$

$$14. \frac{3x-2}{3}+\frac{x+4}{6}=$$

$$15. \frac{1}{a-x}-\frac{3x}{a^2-x^2}=$$

$$16. \frac{r}{r+z}+\frac{r}{r-z}=$$

$$17. \frac{5a+1}{6a}-\frac{3a-2}{2a}=$$

$$18. 3-\frac{3-2x}{4}-2x=$$

$$19. \frac{10x+3y}{2x^2y}-\frac{3x+5y}{xy^2}=$$

$$20. \frac{1}{a+1}-\frac{a}{a^2-a+1}-\frac{a-4}{a^3+1}=$$

$$21. \frac{2}{x-5x+6}-\frac{15}{x+2x-15}=$$

$$22. \frac{3-2x}{(x-1)^3}+\frac{x+1}{(x-1)^2}-\frac{1}{(x-1)}=$$

$$23. \sqrt{20}+\sqrt{45}\div\sqrt{\frac{1}{3}}=$$

$$24. \frac{a}{a-2}-\frac{a-2}{a+2}+\frac{3}{4-a^2}=$$

⁴E. M. Paulu, *Diagnostic Testing and Remedial Teaching*, p. 354. New York: D. C. Heath and Company, 1924. (Data used with permission of the publisher.)

⁵Published by Teachers College, Columbia University, New York City. (Quoted with permission of the publisher.)

TABLE XXXV. TEST RECORDS OF ACCOMPLISHMENTS IN ADDITION AND SUBTRACTION, HOTZ ALGEBRA SCALES, SERIES B⁶

PUPIL	YR. IN H. S.	EXERCISE																				TOTAL CORRECT
		I	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
I.....	pg.																					14
2.....	4																					13
3.....	4																					9
4.....	4																					12
5.....	3																					13
6.....	3																					11
7.....	3																					11
8.....	3																					12
9.....	3																					7
10.....	2																					10
11.....	2																					5
12.....	2																					12
13.....	2																					2
14.....	2																					9
15.....	2																					8
16.....	2																					6
17.....	2																					9
18.....	2																					10
19.....	2																					6
20.....	2																					5
21.....	I																					10
22.....	I																					12
23.....	I																					13
24.....	I																					6
25.....	I																					12
26.....	I																					11
27.....	I																					8
28.....	I																					15
29.....	I																					
Number Wrong		3	3	2	2	11	8	5	9	7	11											

⁶E. M. Paulu, *Diagnostic Testing and Remedial Teaching*, p. 355. New York: D. C. Heath and Company, 1924. (Quoted with permission of the publisher.)

b. Tabulation of results. The results of the test are shown in Table XXXV.

The chart shows the exercises solved correctly (C), those solved incorrectly (O), those attempted but left incomplete (X), and those not attempted at all (shown blank). It also shows the total number of problems correct for each pupil (shown at right-hand edge of table) and the number of pupils who missed each exercise (shown at bottom of table).

c. Diagnosis of results. The scores ranged from 2 to 15 exercises correct. The median of the class was 10.2, the standard being 9.7 exercises. Some of the students, Nos. 11, 13, 19, 20, 24, and 26, were very weak in addition and subtraction, none solving more than 6 exercises. The strong students were of two types, those such as pupil No. 1 who worked many problems missing only a few; and those such as pupil No. 8 who worked the problems correctly as far as taught in the subject. Exercises No. 5 and 10 were difficult for over one-third of the class.

d. Remedial work. Exercise No. 5, which was solving for the unknown in $7x - x + 6 - 4 =$, was difficult for students Nos. 6, 9, 11, 13, 15, 16, 17, 20, 24, 26, and 28. These students constituted over one-third of the class. Their errors were: nine students did not combine $6 - 4$; two did combine, getting -2 ; one did not combine the x 's; eight combined the x 's, getting $8x$. These pupils were grouped together and given special explanations and drill on exercises similar to No. 5.

Another group of students had difficulty with exercise No. 8, which required combination of the terms $20x - (10x + 5x) =$. This exercise was difficult for nine students, four of whom also had trouble with exercise No. 5. The main difficulty

was removing parentheses and changing signs. This difficulty was overcome by superimposing, thus:

$$\begin{array}{r} 20x \\ -(10x \text{ plus } 5x) \text{ (change signs and subtract)} \\ \hline 10x - 5x \end{array}$$

Some of the students, for example, pupils Nos. 4, 8, 12, 22, 23, and 25, were slow but accurate workers, getting all correct that they attempted. The regular class work should suffice for such pupils, plus whatever speed drills the teacher deems necessary. Some of the pupils, for example pupils Nos. 11, 13, 16, 19, 20, 24, and 26, could not combine like terms. None of these pupils solved more than six exercises out of a required 9.7, the standard. Such pupils should receive special help at the points of difficulty and error.

Composition—grade VI.⁷ The Willing Scale for Measuring Written Composition was given by Paulu to 14 pupils of grade VI.

a. **The test.** The Willing Scale for Measuring Written Composition⁸ consists of a series of eight compositions graded in their "story value" from 20 up to 90 points, and in their "form value" from 30 down to 0 mistakes in spelling, punctuation, and syntax per hundred words. Part of the series of compositions is as follows:

20

Deron the summer I got kicked and sprain my arm. And I was in bed of wheeks And it happing up to Washtion Park I was I was so happy when I got the banged of I will nevery try that stunt againg.

Number of mistakes in spelling, punctuation, and syntax per hundred words, 30.

⁷*Ibid.*, p. 174. (Data used with permission of the publisher.)

⁸Published by Public School Publishing Company, Bloomington, Illinois. (Quoted with permission of the publisher.)

30

The other day when I was rideing on our horse the engion was comeing and he got frightened so he through me down and I broke my hand.

Number of mistakes in spelling, punctuation, and syntax per hundred words, 23.

40

My antie had her barn trown down last week and had all her chickens killed from a storm. Whitch happened at twelve oclock at night. She had 30 chickens and one horse the horse was

Number of mistakes in spelling, punctuation, and syntax per hundred words, 17.

50

One time mother and father were going to take sister and I for a long ride thanksgiving. We had to go 60 miles to get there. When sister and I herd about it we were very glad. It was a very cold trip. We four all went in a one seated automobile. Dady

Number of mistakes in spelling, punctuation, and syntax per hundred words, 14.

60

One time when mother, some girl friends and myself were staying up in the mountains. An awful storm came up. At the we were way up in the mountain. The lightning flashed and the thunder roared. We were very frightened for the cabin we were staying at

Number of mistakes in spelling, punctuation, and syntax per hundred words, 11."

70

When I was in Michegan I had an exciting thing happen or rather saw it, it was when the big steamship plying between Chicago and Muskegon was sunk about 7 o'clock in the evening. It caught on fire with a load of cattle and products from the market on board, one of the lifeboats carrying some of the people who were on

Number of mistakes in spelling, punctuation, and syntax per hundred words, 8.

90

The most exciting experience of my life happened when I was five years of age. I was riding my tricycle on the top of our high terrace. Beside the curbing below, stood a vegetable wagon and a horse. Suddenly I got too near the top of the terrace. The front wheel of my tricycle slipped over and down I went, lickety-split, under the horse standing by the curbing. I had quite a high tricycle and the handlebars scraped the horse's stomach, making

Number of mistakes in spelling, punctuation, and syntax per hundred words, 0.

STANDARDS FOR VALUES.—The general standards for "form and story values" are:

Story	20	30	40	50	60	70	80	90
Form	30	23	17	14	11	8	5	0

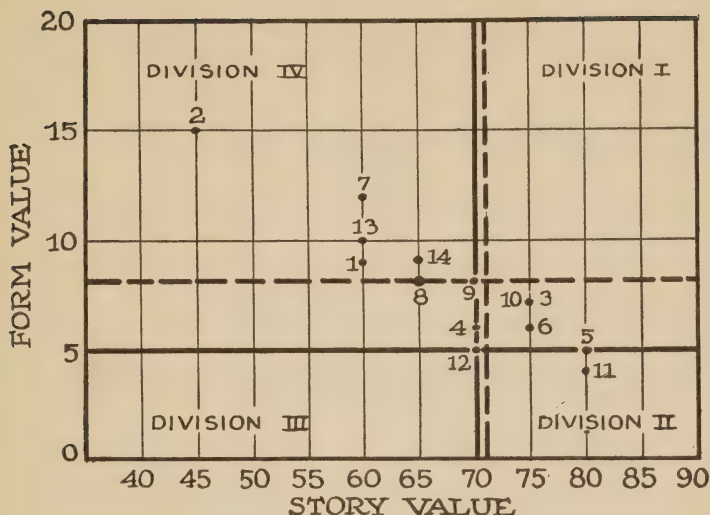
b. Tabulation of results. The compositions written by the 14 pupils were compared with those of the Willing Scale and each composition was scored both for "story value" and "form value." Story value means thought content and arrangement of ideas and may be ranked from 20 up to 90. Form value means errors in spelling, punctuation, and syntax and may rank from 30 to 0. The 14 pupils in this sixth grade made the following scores:

Pupil.....	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Story value.....	60	45	75	70	80	75	60	65	70	75	80	70	60	65
Form value.....	9	15	7	6	5	6	12	8	8	7	4	5	10	9

The grade standards used by Paulu were based on scores obtained from five Kansas cities and were as follows:

GRADE	STORY VALUE	FORM VALUE
IV	44	12
V	58	10
VI	75	5
VII	77	5
VIII	82	5

The smaller numbers, 4, 5, 6, as scores for form value indicate few errors, and the larger numbers, as 11, 13, 15, indicate

FIGURE 4⁹

weakness, or a large number of errors. A graphical tabulation of the scores made by the 14 pupils is shown in Fig. 4.

c. Diagnosis of results. The class medians for the test fell below the grade standards, showing the class as a whole was weak in composition writing ability. There was only one pupil, No. 11, above the grade standards. In division III there was one pupil, No. 12, who was above standard in form value but below in story value. The remaining pupils, eight in all, in division IV, were below standard in both form and story value.

d. Remedial work. Pupil No. 11 was above standard and so was promoted to grade VII. The pupils in divisions II and III were almost at standard. They required no special remedial instruction, the regular class work being adequate. Pupil No. 2 in division IV was doing work of a fourth-grade

⁹*Ibid.*, p. 179. (Used with permission of the publisher.)

nature. It was recommended that he be demoted from grade VI to V. The remaining pupils of division IV were given certain periods for "story value" work and certain other

50

Four scores and seven years ago our fathers brought forth upon this continent a new nation, conceived in liberty, and dedicated to the proposition that all men are equal. Now we are engaged in a great civil war, testing whether that nation, or any nation so conceived

FIGURE 5¹⁰

¹⁰L. P. Ayres, *Ayres Handwriting Scale*. (Used with permission of the Russell Sage Foundation, publishers.)

periods for "form value" work. The remedial work for story value consisted of vocabulary studies, composition work both written and oral, and motivated projects such as letter writ-

60

Four score and seven years
ago our fathers brought forth
upon this continent a
new nation, conceived in
liberty, and dedicated to
the proposition that all
men are created equal

Now we are engaged
in a great civil war, test-
ing whether that nation,
or any nation so con-
ceived and so dedicated

FIGURE 5¹⁰

¹⁰L. P. Ayres, *Ayres Handwriting Scale*. (Used with permission of the Russell Sage Foundation, publishers.)

ing, the school journal, booklets, diaries, and posters. The remedial work for form value consisted of drill in punctuation, spelling, and correct forms of expression.

Handwriting—grade VI.¹¹ Monroe reports a study in handwriting of 33 pupils in grade VI.

a. The test. The pupils were given an informal test in writing.

b. Tabulation of results. The papers were scored for quality of writing and for rate in letters written per minute on the Ayres Measuring Scale for Handwriting, Gettysburg Edition. Two sections from the Gettysburg Edition are reproduced in Fig. 5.

The scores were tabulated by means of a two-way chart as shown in Fig. 6.

c. Diagnosis of results. It is obvious that only two pupils, Laura S. and Nora B., are doing satisfactory work as they are the only pupils above the standard medians for grade VI. On the other hand, there are ten pupils, Walter, William, Frank H., Grant, Giles, Anna, Frank F., Sam, Ethel, and Anna C., who are below standard in both rate and quality. Lynn (in the upper left-hand corner of Fig. 6) is writing too fast (101—110 letters a minute) for the quality (quality of 20) of writing done.

d. Remedial work (suggested). Those below standard should be given intensive drill and furnished with strong motives for doing better work. Pride in self-accomplishment and pride in group-accomplishment are two powerful motives for pupils of the age of grade VI. Lynn should be required to write more slowly and to try to write better. Laura S. and Nora B. need very little attention as they now are above the standards for their grade.

¹¹W. S. Monroe, J. C. DeVoss, and F. J. Kelly, *Educational Tests and Measurements*, p. 192. Boston: Houghton Mifflin Company, 1924. (Used by permission of, and by arrangement with, Houghton Mifflin Company, the authorized publishers.)

Rate	Quality			VI Grade M				Total	
	20	30	40	50	60	70	80		
101-110	Lynn M.							1	
91-100								0	
81-90							Laura S.	1	
71-80			Etta W. Sam J. Arthur C.		Nora B.			4	VI Grade M
61-70		Frank F.	Sam R. Ethel F. Anna C.		Paul S. Cora G.	Rose M.		7	
51-60		Giles M.	Anna H.	Lorna A.	Elbert B. Molly F. Dorothy D.	William Mc		7	
41-50			Grant P.	Arthur R. Violet R. Chas. S.		Victor K.	Cora E.	6	
31-40	Walter P.	Frank H. William K.		Wilma M. Bess D. Allen K.		Clara C.		7	
Total	2	4	8	7	6	4	2	33	

FIGURE 6¹²

Punctuation—college students.¹³ Guiler reports a study of errors in punctuation made by 39 college students.

a. **The test.** At the end of the first six weeks of the college year these students were receiving failing, or nearly failing, grades in English composition. In order to diagnose some of

¹²*Ibid.*, p. 196. (Used by permission of, and by arrangement with, Houghton Mifflin Company, the authorized publishers.)

¹³W. S. Guiler, "Diagnosing Student Shortcomings in English"; *Journal of Educational Research*, 14 (September, 1926), 112. (Data used with permission of the editor.)

the difficulties a series of diagnostic tests, consisting of the Pressey Diagnostic Tests in English Composition—Punctuation and Capitalization, and the Charters Verb and Pronoun Test, were used. The result from the punctuation test is typical of the other results and is the only one presented here.

The Pressey Diagnostic Test in English Composition, Punctuation,¹⁴ consists of 30 sentences as shown below:

1. He ordered salt sugar flour and eggs.
2. His office is at 231 Beacon Street Boston Massachusetts.
3. John thinks the money was stolen the others believe it was lost.
4. J P Morgan and E H Harriman were men of great ability.
5. Its strange that you havent seen him.
6. He said This is the house.
7. He was a big fat blond man.
8. The armistice was signed November 11 1918.
9. He has the mat desk and table however the rug and fan were delayed.
10. Miss Martin came with Mr and Mrs Jones and Dr Smith.
11. He wont believe Ive done it.
12. Here she said is the bill.
13. He was we believe in the insurance business.
14. The telephone rang violently but no one answered.
15. Johnny ran away you know how he does and hid in the barn.
16. What time is it.
17. Johns kite fell at the ladys feet.
18. He said that it was time to start.
19. We sent the goods yesterday in accordance with your telegram.
20. We asked Jones the manager of the concern about the bill.
21. The list begins as follows Jones Smith Peters Jenkins.
22. He asked to what party you belonged.
23. Boys and mens clothes are sold here.
24. The choir sang Rock of Ages.
25. Ever since he has disliked hunting.

¹⁴Published by Public School Publishing Company, Bloomington, Illinois. (Quoted with permission of the publisher.)

26. Mary who is prompt will go in place of the girl who is late.
27. The train leaves at 10 30 in the morning.
28. Quick Come What a sight.
29. The cat with its nose scratched is theirs.
30. Telegraphers call a poor operator a ham op.

The abilities measured by the items in the Pressey Punctuation Test are given by Guiler as follows:

1. A comma to separate words in a series
2. A comma to separate parts of an address
3. A comma to set off a direct quotation
4. A comma to separate parts of a date
5. A comma to set off slightly parenthetical or inserted expressions
6. A comma to separate clauses joined by "and," "but," "for," "as," etc.
7. A comma to set off obviously added elements at the end of a sentence
8. A comma to set off an appositive word, phrase, or clause
9. A comma to set off a clearly introductory expression
10. A comma to set off an adverb used independently
11. A semicolon to separate clauses of a compound sentence not joined by a conjunction
12. A semicolon to separate parts of a compound sentence containing commas
13. A period after an abbreviation
14. An apostrophe to indicate the omission of a letter or letters in a word
15. An apostrophe to show possession
16. Quotation marks to enclose a direct quotation
17. Quotation marks to enclose each part of a divided quotation
18. Quotation marks to indicate the title of a theme, story, or song
19. Quotation marks to call attention to words used with some special meaning
20. A dash to indicate a marked break in the progress of thought in a sentence
21. A question mark after a direct question

22. A colon after an expression that serves as a formal introduction to something that follows

23. A colon between hours and minutes in a statement of time

24. An exclamation point to indicate strong feeling or emotion¹⁵

b. **Tabulation of results.** The results of the test are shown in Table XXXVI.

TABLE XXXVI.—MEASUREMENT OF PUNCTUATION ABILITIES¹⁶

STUDENTS' NUMBERS	MANIFESTED INABILITIES																								NUMBER OF INABILITIES PER STUDENT
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1.....														X						X					2
2.....					X	X							X							X					4
3.....	X																			X					2
4.....	X													X						X					3
5.....			X																	X					2
6.....				X	X			X	X		X	X	X	X	X		X		X	X				X	13
7.....	X										X		X						X	X		X			6
8.....	X																	X	X	X					4
9.....					X	X							X		X				X	X					6
10.....					X	X						X								X					4
11.....	X				X	X		X			X				X				X	X			X	X	10
12.....	X					X	X	X						X					X	X					7
13.....					X						X	X		X	X					X		X			7
14.....	X												X		X					X					4
15.....	X								X		X				X				X	X	X	X		X	10
16.....			X	X	X	X					X	X							X	X					8
17.....	X			X			X	X						X	X	X	X	X	X	X					11
18.....	X				X		X	X					X			X		X		X			X		7
19.....	X		X		X	X	X							X					X	X					8
20.....	X				X								X	X	X			X	X	X					8
21.....		X									X		X	X	X					X			X		7
22.....	X	X		X		X	X		X				X	X					X	X	X				11
23.....	X				X								X		X			X	X	X			X		8
24.....	X			X									X		X				X	X			X		7
25.....	X		X												X				X	X					5
26.....	X	X	X		X						X				X			X	X	X					9
27.....	X		X	X	X	X									X				X	X					8
28.....		X	X	X							X		X	X				X	X	X			X		10
29.....	X										X		X	X	X			X	X	X					8
30.....					X	X	X						X	X	X			X	X				X		8
31.....				X									X		X				X	X					5
32.....												X	X	X				X	X	X			X		7
33.....	X				X									X					X						5
34.....					X								X					X	X	X			X		6
35.....				X							X	X			X					X		X			6
36.....																			X						1
37.....	X	X	X			X		X			X		X	X	X				X	X			X		12
38.....	X				X									X	X				X	X			X		7
39.....			X	X	X		X		X			X								X			X		8
Total....	22	5	9	9	17	13	6	6	4	12	7	18	15	22	1	3	11	25	38	2	4	2	13		
Percent..	56	13	23	23	44	33	15	15	10	31	19	46	38	56	3	8	28	64	97	5	10	5	34		

¹⁵W. S. Guiler, "Diagnosing Student Shortcomings in English"; *Journal of Educational Research*, 14 (September, 1926), 115. (Quoted with permission of the editor.)

¹⁶*Ibid.*, p. 114. (Quoted with permission of the editor.)

The table shows the number of errors made by each pupil, and also the number and percentage of pupils who missed each part of the test.

c. Diagnosis of results. There were no perfect scores in punctuation; in fact one college student, No. 6, failed to reach the standards for grade VIII. The range of errors for the students extended from 1 to 13 errors out of a possible 24. One student, No. 17, could not use quotation marks. All of the students were able to use a comma to set off an adverb used independently, but only twenty-two students of the thirty-nine were able to use a comma to separate words in a series. Student No. 1 was able to use an apostrophe to indicate possession, but could not use it to indicate omission of a letter in a word. These individual shortcomings furnished points for further diagnosis of each individual student's needs.

d. Remedial work. The test showed that the errors were chiefly individual ones. Only a few of the uses of punctuation offered difficulty to the greater part of the students. Hence the problem turned out to be largely an individual one. Self-teaching practice lessons, therefore, were made a large part of the remedial work.

Language—grade VII.¹⁷ Wilson reports the results of giving Story B, of the Wilson Language Error Test, to 22 pupils of grade VII.

a. The test.

WILSON LANGUAGE ERROR TEST—STORY B¹⁸

A FISHING TRIP

John he is awful good to me. He once't ask me to go fishing with him. He said that he could learn me to be a good fisherman in no time. He had saw some men cetch a great many fish about a mile

¹⁷G. M. Wilson, "After-Test Value of Language Error Tests"; *The Second Yearbook*, Vol. II, No. 4, p. 371, Bulletin of the Department of Elementary School Principals, National Education Association of the United States. (Data used with permission of the author.)

¹⁸Published by World Book Company, Yonkers-on-Hudson. (Quoted with permission of the publisher.)

up the river. He said that he had watched them until they became tired. He seen them leave with a large sack full. I agreed to go with him.

"We hain't got no bamboo poles" John said. "The folks haven't none left over from last year. Good poles is difficult to find" John give me the lunch to carry We et our lunch before we done any fishing. I sit the table while John cut two poles and fastened . . .

b. Tabulation of results. The test papers were returned to the pupils and the errors made by each pupil were noted for further study. The teacher prepared a chart showing the 29 errors, the names of the pupils, and a check under the name of each pupil, and opposite each error made. The chart is shown in Table XXXVII.

c. Diagnosis of results. An analysis of the scores made by the class shows that the errors ranged in frequency of occurrence from 0 to 21 errors. The error "is—are" appeared in the test in two different places. In its first appearance where it followed a plural subject, "good poles is," 10 of the 22 pupils failed to correct it. In its second appearance where it followed a compound subject "John and I is" all the pupils corrected it. The total number of errors ranged from 2 errors made by L. Johnson to 26 errors made by L. Peterson. The errors made by pupil L. Johnson were: "good—well," and "went—to go."

d. Remedial work. The aim of each pupil became to make a clear record. The problem of doing this became a specific one for each pupil, thus giving a motive for working. Each pupil made a complete list of his language errors and endeavored to eliminate them before the next test, which came three months later.

Reading—grade III.¹⁹ Paulu reports giving the Monroe

¹⁹E. M. Paulu, *Diagnostic Testing and Remedial Teaching*, p. 232. New York: D. C. Heath and Company, 1924. (Data used with permission of the publisher.)

TABLE XXXVII.—GIVING THE NAMES OF THE PUPILS OF THE SEVENTH GRADE, GILBERT, IOWA, 1921-22, AND SHOWING THE PARTICULAR ERRORS MISSED BY EACH PUPIL, OR CONVERSELY THE PUPILS MISSING EACH ERROR, TEST B, WILSON LANGUAGE ERROR TESTS, PRELIMINARY FORM²⁰

	NAME OF PUPIL																						
	F. Anderson	E. Dodds	E. Eness	O. Fossel	L. Gildersleeve	M. Holstead	M. Jacobson	I. Johnson	L. Johnson	S. Johnson	M. Lake	A. Mathison	G. Mesha	R. Miller	L. Olson	N. Perry	E. Peterson	L. Peterson	C. Ruch	R. Reece	L. Templeton	B. Tressler	Number missing each error
1. John he.....												x	x		x								3
2. awful good.....	x	x	x	x						x	x	x	x				x						17
3. ask for asked.....				x							x	x	x										15
4. once't.....				x				x				x	x										7
5. learn for teach.....	x			x	x							x	x										9
6. on for in.....				x	x												x						4
7. had saw.....				x	x							x											6
8. git for get.....				x	x							x		x									10
9. got for were.....	x	x		x		x		x							x		x						18
10. seen for saw.....	x	x	x	x						x	x	x					x						4
11. hain't got.....	x			x	x									x									6
12. no for any.....				x						x	x												5
13. haven't none.....				x							x												2
14. is for are.....				x	x			x			x		x				x						10
15. give for gave.....				x	x							x					x						10
16. et for ate.....				x													x						2
17. done for did.....					x					x			x	x	x		x		x				9
18. sit for set.....				x								x	x	x	x		x						7
19. hisself.....	x			x						x		x	x	x	x		x				x	x	11
20. good for well.....	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	20
21. to for too.....	x	x	x	x	x		x			x	x	x	x	x	x	x	x	x	x	x	x	x	21
22. git for get.....		x	x	x				x								x							7
23. and went for to go.....	x	x	x	x	x		x	x	x		x	x	x	x	x		x				x	x	20
24. can't never.....	x	x	x					x			x			x									11
25. is for are.....																							0
26. seen for saw.....	x			x									x										5
27. had came.....			x	x	x	x		x		x	x			x		x	x				x	x	15
28. have got.....	x	x	x	x	x					x	x	x	x				x	x				x	13
29. are for our.....	x	x	x	x	x	x		x		x	x	x	x	x	x	x	x				x		17
PUPILS' SCORE OF RIGHTS.....	16	21	5	10	21	21	26	14	27	16	15	18	10	9	19	12	15	3	18	26	16	16	

Standardized Silent Reading Test, Revised,²¹ to 37 pupils in grade III, sections A and B.

²⁰G. M. Wilson, "After-Test Value of Language Error Tests"; *The Second Yearbook*, Vol. II, No. 4, p. 379, Bulletin of the Department of Elementary School Principals, National Education Association of the United States. (Quoted with permission of the author.)

²¹Published by Public School Publishing Company, Bloomington, Illinois. (Quoted with permission of the publisher.)

a. The test. Selected portions of the test are reproduced below.

1. One evening in the late autumn I saw some beautiful birds
 11 come out of the bushes. They were as white as snow. They were
 24 swans. They flew high in the air and sailed
 33 away to the warm South.

38 What kind of bird did I see?

45 pigeon duck goose canary swan

50 2. Hiawatha was a little Indian boy. He had no father and
 61 no mother. He lived with his grandmother. His home was in a
 73 wigwam near the river.

77 Draw a line under the word that tells with whom Hiawatha
 88 lived.

89 father mother grandfather uncle grandmother

94 3. Nowhere in the world do the children have so many good
 105 times as in Japan. They are allowed to play anywhere and there
 117 are all sorts of toys and games for their amusement.

127 Draw a line under the word which best describes the children
 138 of Japan.

140 cross happy fretful good contented

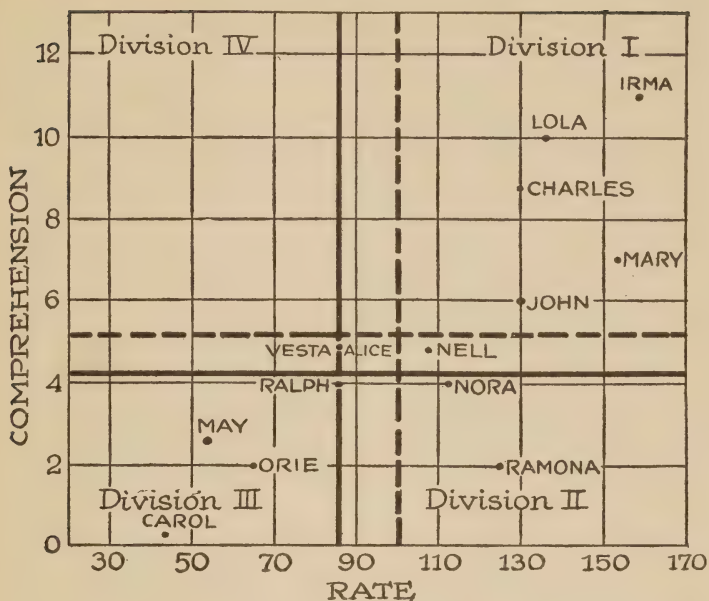
145 4. The mother stork sat in her nest with her four little ones.

157 At a little distance, on the roof, stood the father stork. He drew
 170 one leg up and stood on the other.

178 Where does this paragraph say the father stork was standing?

188 Chimney roof tree nest ground

b. Tabulation of results. The papers were graded and evaluated for both rate and comprehension. The class record sheet was filled in showing the rate and comprehension scores for the two sections, A and B, and the medians computed for each section. A further tabulation was made showing each section divided into four divisions, each division containing those pupils who were above or below the standard medians for rate and comprehension. The tabulation for section A, containing 14 pupils, is shown in Fig. 7.

FIGURE 7²²

The numbers at the bottom represent the rate of reading and the numbers at the left represent the comprehension. The names of the pupils are written into the graph at the point where the rate and comprehension for each pupil intersect. For example, John had a rate of 130 and a comprehension of 6, hence his name was written at the intersection of 130 and 6. In the same way were located the other names. The standards for grade III, midyear, are rate 86 and comprehension 4.2. These standards were represented on the graph with solid black lines. The class medians are shown in dotted black lines.

²²E. M. Paulu, *Diagnostic Testing and Remedial Teaching*, p. 233. New York: D. C. Heath and Company, 1924. (Used with permission of the publisher.)

c. **Diagnosis of results.** The standard medians and the class medians for the test are shown below.

GRADE	SECTION	MEDIAN	RATE	COMPREHENSION ²³
III	A	Class	5.3	100
III	Midyear	Standard	4.2	86

The medians of section A were above the midyear standards and so the test results appear to be good. However, a closer diagnosis reveals certain weaknesses. Fig. 7 shows four divisions of pupils in section A. Division I includes 8 pupils above standard in rate and comprehension, Irma, Lola, Mary, Charles, John, Nell, Alice, and Vesta. Division II includes three pupils above in rate but below in comprehension, Nora, Ramona, and Ralph.

Division III includes three pupils, May, Orie, and Carol, below in rate and in comprehension. Division IV had no pupils included. Hence only 57.1 per cent, or slightly more than one-half of the pupils, were at or above the standards for the grade.

d. **Remedial work.** Four pupils, Irma, Lola, Mary, and Charles, were considered fit for promotion to grade IV. The other pupils were grouped, for remedial work, into three groups.

Group 1 was composed of the pupils of division I. They were required to do the daily work. The daily work, however, was enriched through special assignments in library and supplementary reading. Part of the period was spent on other subjects which these pupils found difficult.

Group 2 was composed of the 6 pupils below standard in comprehension. They were given reading in which under-

²³*Ibid.*, p. 232. (Data used with permission of the publisher.)

standing was especially stressed. This was done through giving easy materials, questions based on the assignment, thought provoking questions, summaries of passages read, selection of interesting passages, explanations of meanings required, dramatization, and various methods of motivation.

Group 3 was composed of the 3 pupils below standard in rate of reading. Among the methods used to stress speed in reading were: supplementary reading, eye training in large units of fixations, easy materials, interesting materials, decrease in lip movement, increase in visual perception, and various methods of motivation. These pupils, Orié, May, and Carol, were given individual tests for further diagnosis.

Reading—grade IV.²⁴ Zirbes reports the results of an experiment in reading. The class was composed of 20 boys of grade IV. In October the pupils were tested to ascertain the oral and silent rates of reading of each.

a. The tests. The tests consisted of five oral and five silent reading trials from which averages were obtained and used as measurements of the reading rate. Comprehension was tested informally.

b. Tabulation of results. The pupils were grouped into four divisions:

The A readers whose rate was 13 or more words a minute

The B readers whose rate was between 9 and 12 words a minute

The C readers whose rate was between 6 and 8 words a minute

The D readers whose rate was less than 6 words a minute

c. Diagnosis of results. The diagnosis revealed 10 types of weaknesses. These weaknesses were:

1. Difficulty in phrasing
2. Lack of eye training and focus

²⁴Laura Zirbes, "Diagnostic Measurement as a Basis for Procedure"; *Elementary School Journal*, 18 (March, 1918), 505. (Data used with permission of the publisher.)

3. Poor comprehension
4. Difficulty in locating given phrase or word
5. Confusion in similar syllables or words
6. Errors of omission, substitution, etc.
7. Breath control
8. Articulation
9. Voice and expression
10. Vocabulary²⁵

d. Remedial work. The remedial work extended over a period of six months and was of two types, that based on the group needs, and that based on the individual pupil's needs. The A readers were permitted to select their own materials, retelling them to the class. The B readers were required to do supplementary reading in pamphlets provided. The C readers and the D readers read stories, alternating in the reading with the teacher or with one another. The individual pupil's needs were corrected as follows:

1. Phrasing—groups of four or five were drilled in silent phrase reading.
2. Eye training and focus—by means of flash cards, games, etc.
3. Poor comprehension—by means of silent reading for reproduction.
4. Location of phrases—through silent reading.
5. Word confusion—through drill on lists compiled from actual mistakes.
6. Errors—by counting errors, or reading until an error occurred.
7. Breath control—through training in breathing exercises.
8. Articulation—articulation exercises were given those with poor speech habits.

²⁵*Ibid.*, p. 509. (Data used with permission of the publisher.)

9. Voice and expression—by means of special training in expression.
10. Vocabulary—word building and word study were encouraged.²⁶

The progress made by the pupils is shown below.

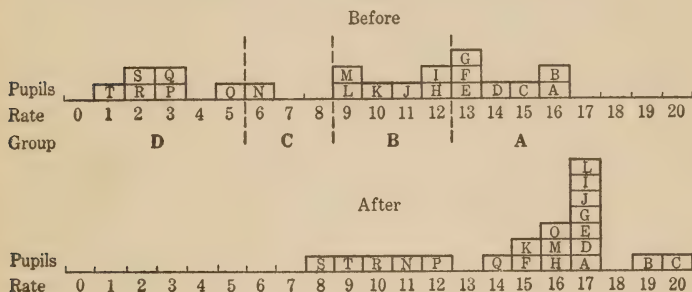


FIGURE 8²⁷

SUGGESTIONS AND STUDY HELPS

1. Prepare a diagnostic test for some subject you are teaching.
2. How did you focus the test upon the learning products?
3. Give the test and tabulate the scores.
4. Make a diagnosis of the errors made by the pupils.
5. Describe the remedial instruction that was applied.
6. How did you apply remedial instruction at the point of error?
7. How did you provide for individual remedial instruction to meet each pupil's needs?
8. What have been the results to date?

HELPFUL REFERENCES

- BUCKINGHAM, B. R., *Research for Teachers*, Ch. VIII. New York: Silver, Burdett and Company, 1926
- GRAY, W. S., *Remedial Cases in Reading*. Chicago: University of Chicago Press, 1922

²⁶*Ibid.*, p. 509. (Data used with permission of the publisher.)

²⁷*Ibid.*, p. 505. (Used with permission of the publisher.)

- HOLLINGWORTH, LETA S., *Special Talents and Defects*. New York: The Macmillan Company, 1923
- MONROE, W. S., and MOHLMAN, DORA, *Training in the Technique of Study*. Urbana: University of Illinois Bulletin, No. 20; Bureau of Educational Research, College of Education, September 8, 1924
- MORRISON, H. C., *The Practice of Teaching in the Secondary School*, Ch. XXVII. Chicago: University of Chicago Press, 1926
- PAULU, E. M., *Diagnostic Testing and Remedial Teaching*. New York: D. C. Heath and Company, 1924

XII

INDIVIDUAL DIAGNOSIS

It is not sufficient that group difficulties be eliminated. Pupils have individual difficulties that remain uncorrected when group diagnosis with remedial instruction has been applied. The specific difficulties, errors, and lack of progress of each pupil must be diagnosed and proper remedial instruction applied at the points of difficulty and error.

Examples of individual diagnosis and remedial instruction are presented in this chapter. From these examples it is possible to secure helpful suggestions relative to the specific methods used by other teachers in applying individual diagnosis to problem pupils. The examples of the case studies include diagnoses in the following subjects:

1. Arithmetic, grade VI
2. Algebra, grade IX
3. Ancient history, grade X
4. Study habits in English, grade X
5. English literature, grade X
6. Handwriting, grade VI
7. Reading, grade III
8. Reading, grade IV
9. Reading, grade VIII
10. Spelling, grade II
11. Spelling, grade X

Arithmetic—grade VI.¹ Dorothy in grade VI was failing in arithmetic.

¹Leo J. Brueckner and Amy Souba, "A Diagnostic Sheet in Arithmetic"; Bulletin of the Department of Elementary School Principals, p. 421. *The Second Yearbook*, 1923. (Data used with permission of the authors.)

a. **The test.** In order to diagnose better the difficulties the following test was given:

DIAGNOSTIC TESTS IN FOUR FUNDAMENTALS²

<i>Addition</i>	<i>Subtraction</i>	<i>Multiplication</i>	<i>Division</i>
I. $\begin{array}{r} 3 \\ 4 \\ \hline \end{array}$	I. $\begin{array}{r} 7 \\ -2 \\ \hline \end{array}$	I. $\begin{array}{r} 6 \\ 3 \\ \hline \end{array}$	I. $2)\underline{6}$
II. $\begin{array}{r} 44 \\ 23 \\ \hline \end{array}$	II. $\begin{array}{r} 19 \\ -3 \\ \hline \end{array}$	II. $\begin{array}{r} 5 \\ 9 \\ \hline \end{array}$	II. $4)\underline{16}$
III. $\begin{array}{r} 28 \\ 4 \\ \hline \end{array}$	III. $\begin{array}{r} 12 \\ -7 \\ \hline \end{array}$	III. $\begin{array}{r} 9 \\ 7 \\ \hline \end{array}$	III. $3)\underline{27}$
IV. $\begin{array}{r} 32 \\ 72 \\ \hline \end{array}$	IV. $\begin{array}{r} 27 \\ -4 \\ \hline \end{array}$	IV. $\begin{array}{r} 41 \\ 3 \\ \hline \end{array}$	IV. $7)\underline{56}$
V. $\begin{array}{r} 1 \quad 23 \\ 6 \quad 14 \\ 1 \quad 38 \\ \hline \hline \end{array}$	V. $\begin{array}{r} 25 \\ -6 \\ \hline \end{array}$	V. $\begin{array}{r} 19 \\ 6 \\ \hline \end{array}$	V. $2)\underline{26}$ $3)\underline{29}$
VI. $\begin{array}{r} 4 \quad 43 \\ 8 \quad 26 \\ 3 \quad 35 \\ 1 \quad 15 \\ \hline \hline \end{array}$	VI. $\begin{array}{r} 29 \\ -15 \\ \hline \end{array}$	VI. $\begin{array}{r} 214 \\ 2 \\ \hline \end{array}$	VI. $7)\underline{357}$
VII. $\begin{array}{r} 3 \quad 47 \\ 3 \quad 25 \\ 5 \quad 64 \\ 8 \quad 34 \\ 7 \quad 13 \\ \hline \hline \end{array}$	VII. $\begin{array}{r} 38 \\ -14 \\ \hline \end{array}$	VII. $\begin{array}{r} 351 \\ 5 \\ \hline \end{array}$	VII. $3)\underline{72}$
	VIII. $\begin{array}{r} 31 \\ -19 \\ \hline \end{array}$		VIII. $8)\underline{720}$
	IX. $\begin{array}{r} 48 \quad 43 \\ -26 \quad -18 \\ \hline \hline \end{array}$		IX. $6)\underline{428}$

X. Summary

X. Summary

²*Ibid.*, p. 424. (Quoted with permission of the authors.)

241

MINNEAPOLIS PUBLIC SCHOOLS³

Name	Dorthy	Grade	6B	Room	2	
Age	12	Intelligence Quotient	95	Score on Test	18-12	
Teacher's Estimate	Scholarship	C	Intell.	B	Effort	B

GENERAL ATTITUDE		GENERAL DIFFICULTIES			
Coöperative	Vocalization-lip movements	x	Accuracy		
	Counting	x	Speed		x
	Guessing		Short memory span		
	Faulty procedure	x	Lack of thoroughness		x

Addition Difficulties			Subtraction Difficulties		
Tests			Tests		
	R	A		R	A
1a ⁴	+	+	1s	—	+
2a	—	—	2s	—	+
3a	—	—	3s	—	—
4a	—	—	4s	—	—
5a	—	—	5s	—	—
6a	—	—	6s		
7a	—	—	7s		
			8s		
			9s		
			10s		

For illustrations see other side of paper.
(See case history)

Multiplication Difficulties				Division Difficulties			
Tests				Tests			
	R	A			R	A	
1m	+	+	1. Multiplier not always multiplier ✓	1d	+	+	1. Roundabout methods ✓
2m	+	+	2. Zero difficulties ✓	2d	+	+	
3m	+	+	3. Carrying difficulties ✓	3d	+	+	2. Uneven division
4m	+	+	4. Placing of product ✓	4d	+	+	3. Zero difficulties
5m	—	—	5. Weakness in fundamentals ✓	5d	+	—	4. Inability to subtract ✓
6m	—	—	6. Very erratic	6d	—	+	5. Forgets what to carry ✓
				7d	—		
7m				8d		—	6. Repeats tables for results
				9d		—	
				rod		—	7. Difficulty with trial division

³*Ibid.*, p. 424. (Quoted with permission of the authors.)

*The numbers 1a, 2a, etc., in the above sheet refer to first, second, etc., problems in addition.

c. **Diagnosis.** 1. *Addition.* Starts backward. Counts with head and fingers. Taps out the results to herself with her tongue. Skips around, sometimes beginning at top and sometimes at the bottom of the column. Has roundabout methods of adding. For example, she worked this way:

7	Said 5 and 5 are 10
4	plus 1 are 11
5	plus 4 are 15
<u>6</u>	plus 7 are 22 (tapped it out)
47	7 and 7 are 14
<u>9</u>	plus 2 are 16
56	4 and 1 are 5
87	5 and 5 are 10
<u>5</u>	plus 2 are 12
92	8 and 1 are 9

She always tapped out the larger numbers or separated them as 8 equals 6 and 2, and 9 equals 6 and 3. In two-column addition it was hard for her to remember what she had to carry.

2. *Subtraction.* Began backward. Of 29 problems in a test she failed in only 4 when allowed to take her time. For example, in her daily class work she worked as follows:

7	Said 3 and 3 equals 6
<u>-3</u>	and 1 equals 7
4	3 minus 7 equals 4
7	Said 4 and 4 equals 8
<u>-4</u>	4 less 1 equals 3
3	
16	Counted 5 dots (10, 11, 12, 13, 14) and
<u>-9</u>	2 equals 7
7	

3. *Multiplication and division.* These were easy for Dorothy. She paid no attention as to which number was the multiplier. It depended upon which number seemed

to be the easier for her. She was apt to rearrange the digits. For example, in her daily class work she worked as follows:

$$\begin{array}{r} 32 \\ \times 7 \\ \hline 124 \end{array} \quad \begin{array}{l} 7 \times 2 \text{ equals } 14 \\ 7 \times 3 \text{ equals } 21 \end{array}$$

$$\begin{array}{r} 3 \overline{)27} \\ \underline{21} \\ 6 \end{array} \quad \begin{array}{l} 7 \times 4 \text{ equals } 28 \\ 7 \times 3 \text{ equals } 21 \\ 21 \text{ from } 27 \text{ leaves } 6 \text{ left over} \end{array}$$

$$\frac{6}{3} = \frac{1}{2}$$

d. Remedial work. Dorothy has need to be taught right habits of work. Individual instruction every day showing her the quickest way to obtain results will be beneficial. In adding she should be taught to begin at the top of the column, not to skip around or separate her numbers.

Algebra—grade IX.⁵ Monroe and Mohlman report the case of a girl, aged 13 years, 7 months, in grade IX who was failing in high school algebra.

a. The tests. In order to diagnose the difficulty the following tests were given: The Monroe Silent Reading Test (see page 232 of the present volume), the Thorndike-McCall Reading Scale (see page 249 of the present volume) and the Burgess Picture Supplement Scale.

b. Tabulation of the scores. The scores made on the above tests were as follows:⁶

TEST	PUPIL SCORE	STANDARD SCORE
Monroe Standardized Silent Reading		
Rate.....	86	86
Comprehension.....	19	26.6
Thorndike-McCall Reading Scale.....	47	61.5
Burgess Picture Supplement Scale....	10	12

⁵W. S. Monroe and Dora Mohlman, "Training in the Technique of Study"; *University of Illinois Bulletin*, No. 20, p. 34. Urbana: University of Illinois, Bureau of Research, College of Education, September 8, 1924. (Data used with permission of the authors.)

⁶*Ibid.*, p. 36. (Data used with permission of the authors.)

c. Diagnosis. The teacher reported that the girl's attitude toward school was one of indifference with no feeling of responsibility toward assignments or requests of the teacher. Frequently the girl bluffed, and said she did not care about her class standing. The tests revealed her to be a rapid reader, with poor comprehension. This was caused by failure to give attention to details. The girl said she depended upon the teacher's explanation in class rather than trying to solve the exercises in the book. Her teacher said the girl manipulated the symbols merely to secure the answer. Her attendance was poor on account of frequent illness.

d. Remedial work. Training in reading to improve the girl's comprehension was undertaken. At first she was indifferent toward the remedial work, but later took an interest. Her scores within four weeks increased as shown below:⁷

TEST	INITIAL SCORE	FINAL SCORE	GRADE NORMS
Monroe Standardized Silent Reading—			
Rate.....	86	89	86
Comprehension.....	19	26	26.6
Thorndike-McCall Reading Scale.....	47	63	61.5
Burgess Picture Supplement Scale.....	10	..	12

Four weeks were devoted to remedial work in algebra. The quality of work done was such that her grade was raised from D to B. This was due to the fact that she felt more responsibility toward her assignments and because her former failures were due partly to carelessness which was now being eliminated through a better attitude toward the work. Special study help questions in algebra were given as shown below:

DIRECTIONS FOR THE STUDY OF ALGEBRA⁸

1. As a preparatory step, get the assignment clearly in mind, recall the teacher's explanation and study again the sample exercises and the explanations given in your textbook.

⁷*Ibid.*, p. 36. (Quoted with permission of the authors.)

⁸*Ibid.*, p. 44. (Quoted with permission of the authors.)

2. Read your exercises carefully. Be certain with each exercise that you understand what is given and what is to be done, and that you keep these facts clearly in mind while working. Make sure that you copy the exercise correctly on your paper.

3. Take plenty of time to think. Do not begin to work until you understand exactly what is given and what is to be done.

4. If you do not know how to begin, consult your textbook and try to recall explanations which your teacher has given.

5. An exercise is frequently made up of a series of steps—do one step at a time.

6. Compare exercises in algebra with the same type of exercises in arithmetic. Frequently this will give you a suggestion.

7. Work carefully. It is easier to avoid mistakes than to find them after they are made.

8. Remember that every symbol in algebra has a very definite meaning.

9. When you are unable to work an exercise do not give up; at least try to find out what your difficulty is.

10. When it is possible to do so, be sure to check the answers which you obtain.

11. Memorize important rules and formulas, but be certain that you understand them.

12. Use rules and formulas as soon as possible after you have learned them in order that you may fix them in your mind.

Ancient history—grade X.⁹ A girl, H.W., aged 18 years, 6 months, in grade X was failing in ancient history.

a. The tests. To diagnose the difficulties, the Monroe Silent Reading Test (see page 232 of the present volume) and the Burgess Picture Supplement Scale were given.

b. Tabulation of the scores. The scores made on the above tests were as follows:¹⁰

TEST	PUPIL SCORE	STANDARD SCORE
Monroe Silent Reading Test—Rate . . .	77	92
Comprehension	28	29.4
Burgess Picture Supplement Scale . . .	15	13

⁹*Ibid.*, p. 30. (Data used with permission of the authors.)

¹⁰*Ibid.*, p. 32. (Data used with permission of the authors.)

c. Diagnosis. The mental age of the girl was 14, or a retardation of four and one-half years. The reading tests showed lack of attention to details, and rapid reading with poor comprehension. It was also discovered that she was afflicted with nervousness due to a fall from a horse. She found it difficult to keep her hands still or her face from twitching. Her geometry teacher said, "H.W. cannot hold a compass steady enough to do accurate construction work." She was frequently absent on account of illness. She had difficulty in concentrating and often failed to get the meaning of what she read.

d. Remedial work. Remedial training was based on reading with emphasis on comprehension. The training was effective as shown by the test results at the end of 10 weeks:¹¹

TEST	INITIAL SCORES	FINAL SCORES	GRADE NORMS
Monroe Silent Reading Test—Rate.....	77	122	92
Comprehension.....	28	34	29.4
Burgess Picture Supplement Scale.....	15	16	13

The remedial training in study habits was based on ancient history. The girl's attention was called to her deficiencies in study procedure, lack of attention to details, and inability to summarize and organize her material.

Special directions for the study of history were given as follows:

1. Before beginning the reading of the lesson in history, be certain that you understand the assignment. It should give you a definite purpose for your reading, that is, you should understand what information you are to find and what use you are to make of it.
2. First, read over the entire assignment rapidly in order to get the general trend of thought and the main ideas. Give attention to the paragraph headings and the marginal summaries.

¹¹*Ibid.*, p. 32. (Quoted with permission of the authors.)

3. Next, read over your lesson a paragraph at a time. Read it carefully. Look up the meanings of unfamiliar words. Locate places mentioned on the map. Read paragraphs and sections to which cross references are made.

4. Underline the important sentences. However, you should be certain that the sentence is important before you underline it.

5. As you study, keep the aim of your assignment constantly before you.

6. Try to determine the reason for the statements which the author makes.

7. Study each paragraph until you are able to give the main points without looking at your book. Commit to memory important names, dates, and definitions.

8. When you have finished an assignment, review it in your mind and summarize it by recalling the most important points. If your lesson consists of several divisions do this for each division.

9. Spend at least as much time in thinking about your lesson as in reading about it.

10. Formulate questions which, in answering, will require an understanding of the most important ideas in your lesson.

11. Try to answer the following questions:

a. What is the relation of today's lesson to the general topic you are studying and what does it contribute to this topic?

b. What is the relation of the general topic to the school subject?

12. When you have finished studying a chapter prepare an outline of it. If you do not understand how to begin such a task, ask your teacher to help you.¹²

Her work improved so that her grade in ancient history was raised from D to A.

Study habits in English—grade X.¹³ A boy, aged 14 years, 3 months, with an I.Q. of 109 was failing in English.

¹²*Ibid.*, p. 43. (Quoted with permission of the authors.)

¹³W. C. Reavis, *Pupil Adjustment in Junior and Senior High School*, Ch. XIV. New York: D. C. Heath and Company, 1926. (Data used with permission of the publisher.)

a. The tests. As a basis for determining the boy's capacity for study application the following tests were given:

1. The Briggs English Form Test. The test follows.

ALPHA¹⁴

Name.....Grade.....Date.....

Here are twenty sentences printed without some necessary capital letters, commas, apostrophes, and end punctuation. In some cases two or more sentences are run together.

Read over each group of words so as to get the meaning. Then put in the proper places capital letters, apostrophes, necessary commas, periods, and question marks.

When you have finished, sit quietly while the other pupils work.

1. birds sing
2. Where is the fire
3. In April the apple trees were in bloom many motorists stopped to admire them
4. the boys hat was torn but his clothes were neat
5. the girls are sewing this morning
6. Who is the man standing by the window
7. Last wednesday the package came unfortunately we were away at the time.
8. the childrens shouts could be heard above the roar of the train but no one paid any special attention to them
9. from her seat under the tree the girl could see every person who passed down the winding road
10. Whose book is this with the cover off and with scribbling and drawings on every page
11. Soon after we returned from the west we began to receive complaints from our neighbors before that time we never suspected the dog of killing chickens
12. On shipboard the sailors beds are canvas hammocks that are slung by ropes from the ceiling but in barracks the men sleep on cots
13. early in the morning of that ever memorable day automobiles

¹⁴Published by Teachers College, Columbia University, New York City. (Quoted with permission of the publisher.)

arrived from every section of the country rolling into town with much noise and raising great clouds of choking dust

14. In the beginning of his administration what was the greatest task that confronted the newly elected and inexperienced mayor of the sleepy little village

15. In america we need five hundred million bushels of wheat each year for our bread getting five hundred out of four hundred sixty million is a problem difficult for any mathematician to solve

16. We had known of Charles singular desire to become a comic actor but until we saw the play last evening we had not suspected that he had any real talent for making people laugh

17. After the usual preliminary's practice by both teams in batting and fielding the umpire called the men together to impress upon them the need of observing the rules in this particular game with the greatest care possible

18. After closing the store at night what do you think this old man with no family and no acquaintances speaking his native tongue could do to amuse himself until bedtime

19. In all the history of the village there are a few stories of genuine pathos one of these concerns a young kentucky boy left an orphan by the sudden and accidental death of both parents at the time of the tragedy

20. Here and there on the dusty shelves of Higgins and Browns dilapidated general merchandise store the boys found cans of salmon and corned beef but their appetites were not whetted by thoughts of a meal of tinned food without a morsel of anything else to go with it

2. The Thorndike-McCall Reading Scale. Samples from Form 4 of the Thorndike-McCall Reading Scale are shown below.

SELECTED READINGS FROM THE THORNDIKE-McCALL
READING SCALE¹⁵

Read this and then write the answers. Read it again if you need to.

Fred lives in the country. He likes to hunt and fish, and has a gun that cost sixteen dollars. His sister Grace keeps hens and ducks,

¹⁵Published by Teachers College, Columbia University, New York. (Quoted with permission of the publisher.)

and sells the eggs. She is learning to play the piano, and goes to Miss Thomas for a lesson every Saturday. She likes music but Fred doesn't.

1. Write the name of the boy who is fond of hunting.....
2. Write the name of the child who likes playing the piano.....
3. Who is learning to play the piano?.....
4. Where does the boy who has the gun live?.....

Read this and then write the answers. Read it again if you need to.

Inside the big box made of wood and iron that stands under the bed there is a box just like it, only smaller, and a brass key to open the small box. Whoever opens it will find three keys, one of gold, one of silver, and one of steel. The first opens the door of the red room, the last opens the door of the blue room. The other opens the outside gate. Every key has a ring.

5. Where will you find the big box?.....
6. What is the chief difference between the boxes?.....

3. The Downey Will Temperament Test.¹⁶ A summary of the test is given below. The test consists of 12 parts as follows:

- a.* Speed of movement. Writing at ordinary speed. (The handwriting speed measures general activity.)
- b.* Freedom from load. Writing as rapidly as possible. (The ratio between ordinary speed and fastest speed.)
- c.* Flexibility. Disguised handwriting. (Shows ingenuity.)
- d.* Speed of decision. Checking of words.
- e.* Motor impulsion. Writing with eyes closed and again while counting. (Shows amount of energy.)
- f.* Reaction to contradiction. Contradicted by examiner.
- g.* Resistance to opposition. Having pen obstructed while writing.
- h.* Finality of judgment. Rechecking number *d* above.
- i.* Motor inhibition. Writing as slowly as possible. (Basis of control.)
- j.* Interest in detail. Copying specimen of handwriting.

¹⁶Published by World Book Company, Yonkers-on-Hudson.

- k. Coördination of impulses. Writing rapidly in a small space.
(Keep in mind the requirements of speed and limited space.)
- l. Volitional perseveration. Time taken to disguise handwriting.
(Shows natural persistence.)

b. **Tabulation of the scores.** The results of the Downey Will Temperament Test are shown in Fig. 9.

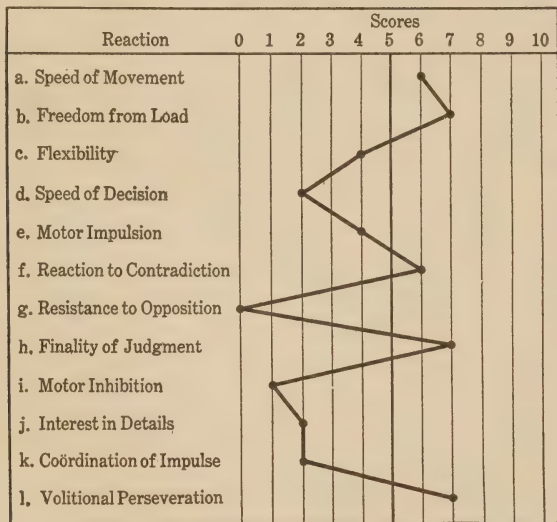


FIGURE 9¹⁷

c. **Diagnosis.** The diagnosis of the test scores showed the pupil to be *strong* in:

1. Speed of movement (quickness of response),
2. Freedom from load (ability to do work),
3. Reaction to contradiction (self-confidence),
4. Finality of judgment,
5. Volitional perseveration (persistence).

¹⁷W. C. Reavis, *Pupil Adjustment in Junior and Senior High School*, p. 290. New York: D. C. Heath and Company, 1926. (Used with permission of the publishers.)

The scores also showed the pupil to be *weak in*:

1. Flexibility (departing from routine assignments),
2. Speed of decision,
3. Motor impulse (self-initiative),
4. Resistance to opposition,
5. Motor inhibition (resistance to unfavorable influence),
6. Interest in detail,
7. Coördination of impulses (handling complex situations).

The cause of failing in English was diagnosed as being due to indifference to matters of form and details in his composition work. His work in other studies was poor because his habits of study were poor.

d. Remedial work. In English he was placed in a special English section organized for pupils of his type. His individual needs were ascertained and received special attention. He was trained in careful reading and encouraged in correct use of English forms. His improvement is shown below:

1. Briggs Form Test in Punctuation.

Initial score: six omissions out of a possible thirty-five, and eight wrong insertions.

Final score: fourteen omissions out of a possible thirty-five, and no wrong insertions.

There was a loss in his ability to use punctuation but a gain in the correct use of the exercises that he did try.

2. Thorndike-McCall Reading Test

Initial Score: 58

Reading Age of 172 months

Final Score: 71

Reading Age of 209 months

With the exception of the punctuation test, there was a decided improvement shown by the two other tests.

3. Downey Test. At the beginning of the year the boy's power of concentration was low. He was easily distracted by slight incidents. Through personal guidance his habits of study improved until he was able to apply himself for 50 minutes without yielding to distractions.

English literature—grade X.¹⁸ A boy, aged 19 years, 6 months, of normal intelligence in grade X of high school was failing in English literature.

a. The tests. To diagnose better the cause of failure the following tests were given: The Monroe Silent Reading (see page 232 of the present volume), the Thorndike-McCall Reading Scale (see page 249 of the present volume) and the Burgess Picture Supplement Scale.

b. Tabulation of the scores. The scores made on the tests are shown below:¹⁹

TEST	PUPIL SCORE	STANDARD SCORE
Monroe Silent Reading—Rate	86	90
Comprehension	25	28
Thorndike-McCall Reading Scale	53	62.9
Burgess Picture Supplement Scale . . .	12	13

c. Diagnosis. The boy had been out of school for three years. His written work was considered poor. He used incomplete sentences and showed lack of knowledge of correct sentence construction. He was absent frequently on account of illness. He had a slight deafness, was self-conscious, and did not volunteer in class. The tests showed that he gave little attention to details in reading; that he failed to think about what he read; that he had a habit of skipping some of the words; and that he was deficient in reading vocabulary. His grade in English was a D.

¹⁸W. S. Monroe and Dora Mohlman, "Training in the Technique of Study"; *University of Illinois Bulletin*, No. 20, p. 23. Urbana: University of Illinois, Bureau of Educational Research, College of Education, September 8, 1924. (Data used with permission of the authors.)

¹⁹*Ibid.*, p. 23. (Data used with permission of the authors.)

d. **Remedial work.** Remedial instruction was given to improve his deficiencies in reading. This training consisted of exercises to increase the rate of reading; to increase the span of recognition; to enlarge the vocabulary; to engender skillful eye movements; to arouse interest, correct errors, give training in answering questions from memory, give training in finding answers to questions, and give training in explaining meanings. His scores in reading increased as follows within 10 weeks:

TEST	INITIAL SCORES	FINAL SCORES	GRADE NORMS ²⁰
Monroe Silent Reading—Rate.....	86	106	90
Comprehension.....	25	32	28
Thorndike-McCall Reading Scale.....	53	55	62.9
Burgess Picture Supplement Scale.....	12	15	13

He was given training in proper methods of study to secure meaning of what he read and to develop independent thinking. Special study help questions as shown below were given.

DIRECTIONS FOR THE STUDY OF ENGLISH LITERATURE—POETRY

1. Think over the title of the poem you are to study and try to form some opinion as to what the poem will be about.
2. Read the entire poem through rapidly to get the general trend of thought.
3. Next, read the poem more carefully, probably a stanza at a time, in order to obtain its full meaning. Frequently reading aloud will assist in understanding the poem as well as in appreciating it.
4. Look up and read the notes given in your text.
5. Unless you are certain that you do not need further assistance in understanding the meaning, try to find information about the names and historical places mentioned in the poem.
6. Look up the meaning of unfamiliar words.
7. If there are difficult points, make a note of them so that you may ask your teacher about them in class. Try to ask your teacher one good question each day.

²⁰*Ibid.*, p. 23. (Quoted with permission of the authors.)

8. Write out a sentence which will express central thought of theme of the poem.
9. Pick out and make note of the most important characteristics of the poem.
10. Think over your own experiences in order to discover possible illustrations of the poem.
11. Decide whether you agree with everything the poet says.
12. At the end of your study summarize your lesson by recalling the most important points of the poem.²¹

SUPPLEMENTARY DIRECTIONS FOR THE STUDY OF
ENGLISH LITERATURE—PROSE

1. Think over the title of your assignment and decide what it will be about.
2. First read the entire lesson through and get the general trend and the main ideas.
3. Next, read it through more carefully, trying to understand everything the author says.
4. Look up, and read the notes given in your book.
5. In case you do not derive a satisfactory meaning from the context, look up the meaning of the words which you do not know.
6. Look up information in regard to places and historical names if such occur in your lesson.
7. Pick out the important *ideas* in your assignment. Indicating them by an underline is a good way but you should make certain that the words selected express the important idea before you underline them.
8. Write out in a sentence or two the central thought of your lesson.
9. Decide whether you agree with the statements which the author makes.
10. At the end of your study summarize the lesson. Be sure to include in this summary all of the important points.²²

Handwriting—grade VI.²³ A boy, aged 12, with an I.Q. of 152, was failing in handwriting in grade VI.

a. The tests. In order to diagnose the difficulties fully,

²¹*Ibid.*, p. 45. (Quoted with permission of the authors.)

²²*Ibid.*, p. 46. (Quoted with permission of the authors.)

²³Dorothy Van Alstyne, "A Study of Ten Gifted Children Whose School Progress Was Unsatisfactory"; *Journal of Educational Research*, 8 (September, 1923), 122. (Data used with permission of the editor.)

the following tests were given: the Binet Test; the Healy Bronner Learning Tests; the Pintner Mental and Educational Tests; and the Woodworth-Mathews Test.

b. Tabulation of the scores. The Binet Test showed the boy had an I.Q. of 152 which would classify him as a highly superior child. The Healy Bronner Test indicated that he was far above the average in learning capacity. The Pintner Mental and Educational Tests showed his mental rating "bright" and his educational rating as "good." The Woodworth-Mathews Test score was 32 errors, the median for his age being 20.

c. Diagnosis. The diagnosis revealed that the boy was self-reliant and self-willed. He was emotionally unstable, and had poor study habits. In his writing he was very awkward. Not only did he write with his left hand, but he held the pen as if he were writing backward. This made his writing very slow.

d. Remedial work. Because of his emotionally unstable condition, his play, food, and sleep were closely supervised. He was given training consisting of motor activity to help him gain proper control of his handwriting. He was given lessons with the Courtis practice tests in handwriting. His writing improved to such an extent that he now is able to do all his required written work in legible longhand.

Reading—grade III.²⁴ A girl in the third grade was failing in reading.

a. The tests. In order to diagnose the difficulties better, the following tests were given:

1. The Monroe Silent Reading Test. (See page 232 of the present volume.)

2. The Courtis Silent Reading Test.

²⁴Ruth Geiger, "A Study in Reading Diagnosis"; *Journal of Educational Research*, 8 (November, 1923), 283. (Data used with permission of the editor.)

3. The Thorndike Visual Vocabulary Scale.²⁵ There are four forms of this scale: Scale A2x, A2y, Bx and By. Each form contains from 10 to 13 lines of words to be classified, each line containing ten words of the same difficulty. The purpose of these forms is to determine the extent of the pupil's vocabulary. The general directions and four lines from Scale A2y are shown below.

General directions

Write the letter F under every word that means a *flower*.

Write the letter A under every word that means an *animal*.

Write the letter N under every word that means a *boy's name*.

Write the letter G under every word that means a *game*.

Write the letter B under every word that means a *book*.

Write the letter T under every word like *now* or *then* that means something to do with *time*.

Write the word GOOD under every word that means something *good to be* or *do*.

Write the word BAD under every word that means something *bad to be* or *do*.

(Four lines: from Scale A2y, Nos. 4y, 6y, 8y, and 10y)

4y. wolf, lily, bear, kind, clean, buttercup, cruel, truthful, elephant, baseball.

6y. during, noon, jesse, month, jeffrey, oscar, forenoon, generous, later, rhinoceros.

8y. croquet, jasper, capable, hollyhock, jason, shuffle-board, conrad, owen, gradual, hiram.

10y. anemone, depraved, beagle, balsam, hugh, prudent, calliopsis, whist, tolerant, roderic.

4. The Gray Oral Reading Test.²⁶ The first, fourth, eighth, and twelfth paragraphs are reproduced below.

I

A BOY HAD A DOG.

THE DOG RAN INTO THE WOODS.

THE BOY RAN AFTER THE DOG.

²⁵Published by Teachers College, Columbia University, New York City. (Quoted with permission of the publisher.)

²⁶Published by Public School Publishing Company, Bloomington, Illinois. (Quoted with permission of the publisher.)

HE WANTED THE DOG TO GO HOME.

BUT THE DOG WOULD NOT GO HOME.

THE LITTLE BOY SAID, "I CANNOT GO HOME WITHOUT MY DOG."

THEN THE BOY BEGAN TO CRY.

4

Once there lived a king and queen in a large palace. But the king and queen were not happy. There were no little children in the house or garden. One day they found a poor little boy and girl at their door. They took them into the beautiful palace and made them their own. The king and queen were then happy.

8

The crown and glory of a useful life is character. It is the noblest possession of man. It forms a rank in itself, an estate in the general good will, dignifying every station and exalting every position in society. It exercises a greater power than wealth, and is a valuable means of securing honor.

12

The hypothesis concerning physical phenomena formulated by the early philosophers proved to be inconsistent and in general not universally applicable. Before relatively accurate principles could be established, physicists, mathematicians, and statisticians had to combine forces and work arduously.

b. Tabulation of the scores. The scores made on the foregoing tests were as follows:²⁷

TEST	PUPIL SCORE	STANDARD SCORE
Monroe Silent Reading—Rate.....	61	52
Comprehension.....	10	7.2
Curtis Silent Reading—Rate.....	109	113
Comprehension.....	50	78
Thorndike—Test of Word Knowledge.	4½	4
Gray Oral Reading Test.....	65	71

²⁷Ruth Geiger, "A Study in Reading Diagnosis"; *Journal of Educational Research*, 8 (November, 1923), 284. (Data used with permission of the editor.)

c. Diagnosis. There were two causes for the girl's low score on the Gray Oral Reading Test: first, a nervous temperament, and second, her foreign parentage. These produced in her reading, errors of substitution, omission, and insertion. Because of these errors faulty ideas resulted causing a low score in comprehension on the Courtis Silent Reading Test.

d. Remedial work. The objective became to improve the accuracy of reading. This was attempted by having the pupil read until a mistake occurred. An intensive review of second year phonics with word analysis was given to improve the pupil's recognition and recall of words. A study of special endings such as "cial," "cy," and "ance" was included. Drill on confusing words such as "than" and "then," "come" and "came," was provided. Proper breathing exercises were found to be necessary. Descriptive material was read for training in comprehension. The results after six months of such training were as follows: in the Monroe Silent Reading Test a gain of nearly a year in comprehension; in the Courtis Silent Reading Test a gain of more than a year in comprehension, and more than three years in rate of reading.

Reading—grade IV.²⁸ A girl in the fourth grade was failing in reading.

a. The tests. The following tests were given:

1. Gray's Oral Reading Test (see page 257 of the present volume).

2. Gray's Silent Reading Test.

b. Tabulation of the scores. The scores made on Gray's Oral Reading Test and Gray's Silent Reading Test are shown on page 260.

²⁸C. J. Anderson, and Elda Merton, "Remedial Work in Reading"; *Elementary School Journal*, 20 (May, 1920), 685. (Data used with permission of the publisher.)

PROGRESSIVE PRACTICES

GRAY'S ORAL READING TEST²⁹

NUMBER OF PARAGRAPH	TOTAL NUMBER OF ERRORS	RATE IN WORDS PER SEC.
I	1	2.4
II	2	2.2
III	1	2.4
IV	0	1.9
V	3	1.1
VI	5	1.1
VII	9	.7

The standard score for grade IV is 47.0.

The pupil's score on the test was 41.2.

GRAY'S SILENT READING TEST³⁰

SELECTION	RATE		QUALITY	
	STANDARD	PUPIL	STANDARD	PUPIL
Tiny Tad				
Grade II.....	1.5	1.1	32	0
Grade III.....	2.3	1.1	37	0
The Grasshopper				
Grade IV.....	2.2	1.0	29	0

An informal reading test chosen from the pupil's fourth reader, consisting of the passage shown below, was also given. The girl was asked to read it silently and to reproduce it.

THE BUCKWHEAT

When you pass a field of buckwheat after a thunderstorm you will often find it looking black and singed as if a flame of fire had swept over it. Peasants say, "The lightning has caused this." But why did the lightning blacken the buckwheat?

I will tell you what I heard from the sparrow who was told by an old willow tree standing near a field of buckwheat. It was a large, imposing old willow tree, although somewhat crippled by old age and split in the middle; grass and a bramble-bush grew in the cleft.

²⁹*Ibid.*, p. 688. (Quoted with permission of the publisher.)

³⁰*Ibid.*, p. 688. (Data used with permission of the publisher.)

The tree was bending down its branches so that they nearly touched the ground, hanging down like long green hair.

In all the neighboring fields grew corn, and also oats—splendid oats indeed—which looked, when they were ripe, like many little yellow canary birds on a branch. The corn was lovely to look at, and many of the very largest and best ears were hanging down as if to show their humility.

Close by, right opposite the old willow tree, was a field of buckwheat. The buckwheat did not bend down like the corn, but stood proudly and stiffly upright. . . .³¹

c. Diagnosis. Reproduction of the article for thought resulted in statements such as: "When you pass by the buckwheat, you see corn," "If you pass by, you will hear a sparrow." Of eight questions asked, only one was answered and that incorrectly. The diagnosis revealed that knowledge of the mechanics of reading permitted the girl to read material far beyond her comprehension of what she was reading.

d. Remedial work. The remedial work consisted of silent reading from second- and third-grade readers. A 35-minute lesson each week was given the girl for six weeks. Meanings of words and phrases as thought units were emphasized.

Gray's Silent Reading Test was repeated at the end of six weeks with the following scores:³²

SELECTION	RATE		QUALITY	
	BEFORE	AFTER	BEFORE	AFTER
Tiny Tad				
Grade III.....	1.1	1.8	0	46
The Grasshopper				
Grade IV.....	1.0	1.2	0	18

That there was a decided improvement is evidenced not only from the above scores, but also from the fact that in

³¹*Ibid.*, p. 688. (Quoted with permission of the publisher.)

³²*Ibid.*, p. 692. (Data used with permission of the publisher.)

March the girl was reading short selections 17 to 40 words in length from a second-grade reader with difficulty, while in May she was reading with good comprehension selections 150 words long from a fourth-grade reader.

Reading—grade VIII.³³ A boy, J.P., aged 14, was failing in eighth-grade reading.

a. The tests. The following tests were given:

1. The Illinois Intelligence Test.
2. The Gray Oral Reading Test (see page 257 of the present volume).
3. The Burgess Silent Reading Test.
4. The Courtis Silent Reading Test.
5. The Monroe Silent Reading Test (see page 232 of the present volume).

Informal tests in reading were also given.

b. Tabulation of the scores. The scores made by the pupil on the tests were:

TESTS	J. P.'S SCORES	STANDARD EIGHTH-GRADE SCORES ³⁴
The Illinois Intelligence Test.....	79	100
The Gray Oral Reading Test	33.75	48
The Burgess Silent Reading Test.....	14	50
The Courtis Silent Reading Test:		
Rate.....	188	191*
Comprehension.....	93	95*
The Monroe Silent Reading Test:		
Comprehension.....	9	26

*Standard score for sixth grade. (Standard score for eighth grade not given.)

c. Diagnosis. The pupil's mental age as shown by his intelligence test was 3 years below his chronological age.

The reading tests showed the pupil to be below standard

³³W. S. Gray, *Remedial Cases in Reading: Their Diagnosis and Treatment*, p. 74. Chicago: University of Chicago Press, 1922. (Data used with permission of the publisher.)

³⁴*Ibid.*, p. 75. (Quoted with permission of the publisher.)

in rate of reading and also in comprehension of what was read. In oral reading he mispronounced, repeated, substituted, omitted final syllables, and accented incorrectly.

Questioning revealed that the boy had not formed the habit of thinking about what he had read. He was handicapped by a narrow background of experience and a limited meaning vocabulary. He was lacking also in imagination and in appreciation of meanings.

d. Remedial work. Remedial work for a period of six weeks was organized along these lines: (1) to secure his interest; (2) to develop the habit of looking for meanings in sentences; and (3) to develop recognition of words. His interest was aroused by outside readings, or telling part of a story and then letting him finish reading it. The habit of looking for meanings was developed through thought-provoking questions, written directions to follow, reproduction of sentences, and other similar exercises. Recognition of words was developed through drill on word lists, division of new words into syllables, accent marking, and other devices.

At the end of the six weeks' remedial training the boy was given the tests indicated below, with the scores as shown in the table.

TESTS	OCTOBER SCORES	NOVEMBER SCORES	STANDARD EIGHTH- GRADE SCORES ³⁵
The Gray Oral Reading Test.....	33.75	45	48
The Burgess Silent Reading Test.....	14	50	50
The Curtis Silent Reading Test:—Rate..	188	191	191*
Comprehension.....	93	98	95*
The Monroe Silent Reading Test.....	9	22.32	26

*Standard score for sixth grade. (Standard scores for eighth grade not given.)

³⁵*Ibid.*, p. 80. (Quoted with permission of the publisher.)

1 *er* 2 2 *sul*
 2 *no* 2 3 *lit*
 4 *ran* 2 4 *a*
 5 *sen* 2 5 *uk*
 6 *sim* 2 6 *uk*
 7 *sibl* 2 7
 8 *blee* 2 8
 9 *nus*
 10 *farac*
 11 *uc*
 12 *burn*
 13 *ut*
 14
 15 *fell*
 16 *nln*
 17 *sudden*
 18 *st*
 19 *uc*
 20 *plet*
 21 *ut*

FIGURE 10³⁶

³⁶*Ibid.*, p. 50. (Used with permission of the editor.)

The results were that in six weeks the boy had reached the standards for his grade in rate of reading. His comprehension score in the Curtis Test was above standard and in the Monroe Test slightly below standard.

Spelling—grade II.³⁷ Herbert, a boy aged 8 years, 9 months, in the second grade, was failing in spelling.

a. The tests. He was given the following to test his ability in spelling:

1. A list of words suitable for grade II.
2. His name and a list of seven words suitable for grade I.
3. The letters of the alphabet.

b. Tabulation of the scores. Herbert's attempt to spell the list of words suitable for grade II is shown in Fig. 10.

His attempt to spell his name and a list of seven words suitable for grade I is shown below in Fig. 11.

rah
 so
 be
 red

 se
 bad
 me
 Herb

FIGURE 11³⁸

³⁷Bernice Leland, "Herbert: A Study in Difficulty in Spelling and Reading"; *Journal of Educational Research*, 8 (June, 1923), 49. (Data used with permission of the editor.)

³⁸*Ibid.*, p. 51. (Used with permission of the editor.)

c. Diagnosis. Long periods of hesitation and emphatic lip movements characterized his spelling. He repeated letters to himself and tried to "sound out" the words. He wrote *e* for *c*, *b* for *f*, *j* for *g*, *g* for *j*, *u* for *w*, and *w* for *y*. He also confused the sounds of some of the letters for he gave *u* for *w*, *j* for *g*, and no response for *v*. When he studied he spent the time repeating letters to himself, bobbing his head, and puckering up his features. He could read nothing that he wrote.

d. Remedial work. Spelling, as such, was put aside and emphasis put upon reading. There was presented a reading vocabulary, starting on a first-grade level, by rote rhymes, stories, or sentences, by action play, by labeling objects, and by telling him words. Each word found difficult was noted, attention directed to it, and then written on the board where Herbert traced the outline over and over, pronouncing the word as he finished. When he felt he knew the word, he erased it and tried to write it. In studying the words that he read he looked at the word carefully and pronounced it. He named the letter, wrote the word, located the errors, repeating until he had written the word correctly three times.

His progress was as follows:

DATE	SPELLING MATERIAL	RESULT
September 19	25 IIA words	0 correct
October 13	His name	Correct
October 28	Four short sentences	1 error
	Five words in list	Correct
January 2	Began IIB course of study in spelling	
January 18	Eight IIB sentences	3 errors
	Six words in list	Correct
February 17	Regular IIA lesson in classroom	Correct
March 6	21 words in list from IIA and IIB	8 errors

May 8	Reported doing satisfactory work in IIA	1 error
May 25	25 words final test	1 error
June 19	Promoted to IIIB	
December 8	25 words from IIIB list	Correct ³⁹

Spelling—grade X.⁴⁰ A boy with an I.Q. of 118, aged 14 years, 11 months, in grade X, was failing because of poor spelling.

a. The tests. Lists U, V, and Y of the Buckingham Revision of the Ayres Spelling Scale were given. Also the dictation exercise, Form A, of the Stanford Achievement Test and 100 words selected from a classified word list.

b. Tabulation of the scores. The following are typical of the words misspelled:

receive	(recieve)
apiece	(apeice)
achieve	(acheive)
issue	(essue)
majority	(majorety)
circumstance	(cerceumstance)
responsible	(responcible)
develop	(develope)

c. Diagnosis. The cause of the misspelling of *receive*, *achieve*, and *apiece* was identified as a confusion of *ie* and *ei*; the misspelling of *issue* and *majority* was identified as failure to recognize phonic qualities of syllables; and the misspelling of *circumstance*, *responsible*, and *develop* was due to lack of associating word parts with their proper sound unit.

d. Remedial work. The pupil was made to feel an interest in his work, his attitude changing from "I can't spell; I hate

³⁹*Ibid.*, p. 57. (Quoted with permission of the editor.)

⁴⁰P. A. Witty, "Diagnosis and Remedial Treatment of Poor Spellers"; *Journal of Educational Research*, 13 (January, 1926), 39. (Data used with permission of the editor.)

spelling; I never have been able to spell" to his own suggestion that he keep a daily record of his errors. Habits of being alert for new words, checking written work, tabulating errors, and listing difficult new words were developed. The basic principles involved in the types of errors were studied, actuating a zest for correcting them. The remedial work was continued for 8 weeks. Each week one specific difficulty was emphasized. The pupil was shown the particular habit at fault and was encouraged to try to substitute the correct one. Follow-up work for the week was then outlined. The following classification of spelling habits was used:

- I. Attention to syllables
 - A. Rhythmic pattern of the word
 - B. Differentiation of syllables
 - C. Phonic qualities of each syllable
- II. Establishing a new or unique reaction
- III. A. Distinguishing between possible and impossible ways of writing a given word sound-unit.
 - B. Spelling particular word-units according to their proper sound-unit categories:
 1. *ie* or *ei*
 2. *os*, *oes* in plural
 3. Change *y* to *i* when suffix is added
 4. Drop silent *e* when suffix is added
 5. *c* and *g* soft before *ei* and *y*
 6. Double consonant when suffix is added
 7. *some* as a suffix
 8. *ment* as a suffix
 9. *ful* as a suffix
 10. *ed* especially when pronounced *t*
- IV. Forming letters legibly in handwriting
- V. Coördination and motor-control

(Lapses or slips, reversals of order, omission, or insertions)⁴¹

⁴¹*Ibid.*, p. 40. (Quoted with permission of the editor.)

SUGGESTIONS AND STUDY HELPS

1. Why do individual difficulties often remain uncorrected when group diagnosis has been applied?
2. Select a pupil whom you consider to be a problem case. List the factors that you think are contributing to his failure.
3. Make an individual diagnostic test, give it, and tabulate the scores.
4. Diagnose the errors and locate, if possible, the cause of each error.
5. Describe the remedial instruction that was applied.
6. What were the results?
7. Did the diagnosis confirm your preliminary diagnosis made in No. 2 above?
8. How would you overcome poor personality traits?

HELPFUL REFERENCES

- CHARTERS, W. W., *The Teaching of Ideals*. New York: The Macmillan Company, 1927
- GRAY, W. S., *Remedial Cases in Reading*. Chicago: University of Chicago Press, 1922
- HOLLINGWORTH, LETA S., *Special Talents and Defects*. New York: The Macmillan Company, 1923
- MONROE, W. S., and MOHLMAN, DORA, *Training in the Technique of Study*. Urbana: University of Illinois Bulletin, No. 20, Bureau of Educational Research, College of Education, September 8, 1924
- MORRISON, H. C., *The Practice of Teaching in the Secondary School*, Ch. XXXI. Chicago: University of Chicago Press, 1926
- REAVIS, W. C., *Pupil Adjustment in Junior and Senior High School*. New York: D. C. Heath and Company, 1926

XIII

SHOWING PROGRESS TOWARD THE LEARNING PRODUCT

The progress chart. An important factor in teaching is to motivate the learning by a record of the pupil's progress. Such a record is usually called a progress chart. A progress chart, as its name implies, is a chart that shows the progress made by a pupil, or a group of pupils, toward attainment of the learning product.

Value of knowing one's progress. A definite representation of the pupil's progress is a valuable means for motivating the learning activities. Pupils do more and better work when they know their progress. Experimental evidence confirming this is rapidly accumulating.

1. Arps¹ in an experiment using the ergograph found that students did more work and better work when they knew the results of their efforts. In this experiment a total of 226 records were made consisting of known and unknown series of work periods. The known series consisted of work periods in which the student was fully aware of his progress during the period, and also of his progress during all the previous work periods; in the unknown series the student was not aware of his progress nor the results of any of the former periods. The work done was measured both in amount done and rate at which work was done. Within the limits of the experiment it was found when the student knew his progress that the *amount* of work done was 10 per cent greater than when he did not know his progress; it was also found when

¹George G. Arps, "Work with Knowledge of Results vs. Work without Knowledge of Results"; *Psychological Monographs*, XXVIII, No. 3, p. 41, 1920. (Data used with permission of the editor.)

the student knew his progress that the *rate* of work was from 18 per cent to 35 per cent faster than when he did not know his progress. It is thus seen that a knowledge of what he is achieving not only stirs a pupil to do more work but also to work faster.

2. A similar experiment was made by Wright² to compare the amounts of work accomplished when working under two different conditions. The first situation consisted in the student working until he got tired; the second, in working until he got a result that could be seen and measured. In the first task all incentives such as watching the instrument or keeping track of his progress were denied; in the second task the student was encouraged to watch his work, count the number of times the weight was moved, and put forth his utmost effort.

The gain resulting from a knowledge of the progress is shown in Table XXXVIII.

TABLE XXXVIII.—GAIN MADE WHEN STUDENT KNEW HIS PROGRESS³

STUDENT	PROGRESS	NUMBER OF TRIALS	AVERAGE AMOUNT OF WORK DONE	GAIN IN PER CENT WHEN PROGRESS WAS KNOWN
K	Unknown	24	981.4	4.8
	Known	26	1028.5	
S	Unknown	11	3584.6	42.0
	Known	13	5091.3	
W	Unknown	32	3760.6	15.6
	Known	37	4348.3	
P	Unknown	6	4085.1	2.2
	Known	5	4175.6	

²W. R. Wright, "Some Effects of Incentives on Work and Fatigue"; *Psychological Review*, 13 (January, 1906), 23. (Data used with permission of the editor.)

³*Ibid.*, p. 23. (Data used with permission of the editor.)

A comparison of the results given in Table XXXVIII shows a gain by all students in the work done when they knew their progress.

3. When the pupil knows his record, whether that record be good or poor, his progress toward the learning product is facilitated. Gates and Rissland report the effect of encouragement and of discouragement upon the performance of pupils. Seventy-four students were given tests of coördination and of color naming. After the tests, one-third of the pupils were encouraged by being told that they had done splendid work. They then were told that because their scores were so good they were to repeat the test to see if they could better their scores. Another third of the group were discouraged by telling them their scores were really very poor ones. Then they also were told to repeat the test to see if they could better their scores. The last third were neither encouraged nor discouraged, but were told to repeat the test. The results are shown in Table XXXIX.

TABLE XXXIX.—PERCENTAGE OF PUPILS WHO IMPROVED, FELL OFF, OR REMAINED THE SAME IN THE THREE GROUPS⁴

TEST	IMPROVED	FELL OFF	REMAINED THE SAME
Coördination			
Encouraged.....	89	11	0
Discouraged.....	70	26	4
Repetition.....	64	28	8
Color-naming			
Encouraged.....	58	38	4
Discouraged.....	51	40	9
Repetition.....	44	48	8

The experiment showed that merely to be told that one is doing either well or poorly serves as an incentive to im-

⁴Georgina S. Gates and Louise Rissland, "The Effect of Encouragement and of Discouragement upon Performance"; *Journal of Educational Psychology*, 14 (January, 1923), 24. (Data used with permission of the authors.)

prove one's score upon being retested. For example, in the coördination test, 89 per cent of the pupils encouraged and 70 per cent of those discouraged improved, while only 64 per cent of those who were told nothing except to repeat the test, improved. In the color naming test, 58 per cent of those encouraged and 51 per cent of those discouraged, improved, while only 44 per cent of those who were told nothing except to repeat the test, improved. The experiment is clearly in favor of telling the pupil his score, whether that score be good or poor.

It is thus seen that definite knowledge of one's progress is a valuable means for motivating the learning activities. If this fact were applied to school work it would result in more economical learning. Teachers should find some means of measuring and recording the progress of each pupil. On such a progress chart, the progress from day to day, and from month to month, could be shown. The pupil himself should be taught how to make and interpret the chart and should plot his own progress. A pupil thus working with a knowledge of his achievement would make a better record than he would with his progress unknown to him. A better record would be made by the pupil because, knowing his progress, he would work with greater rapidity and with higher efficiency.

A great amount of school work should be in the form of practice exercises by which the pupil could test himself, keep his own score, and watch his progress from week to week. The pupil would thus not only compete with others, but also with himself. He could record how fast he read, how much he comprehended, how well he wrote, how well he spelled, where he was in quality of composition, or how many words he knew in a foreign language. These things would be a

stimulus to succeed, and success is an important factor in economical learning.

The basic principles underlying progress charts. There are at least four basic principles underlying the idea of all progress charts. These principles may be stated as follows:

a. Definite learning products set up as ways of behaving.

b. An initial score established from which further progress can be measured.

c. An extent-of-progress score established to determine how far the pupil has progressed toward attainment of the learning product.

d. A graphical form easily made and understood.

a. Definite learning products set up. All learning is a self-active process on the part of the pupil and produces a change, a transformation of processes, a new way of behaving. This new way of behaving should be set up in terms of pupil activity as a learning product to be attained by the pupil. All progress should then be measured in relation to attainment of this learning product. Examples of learning products set up in terms of pupil activity are: to type 60 words a minute with not more than three errors per hundred words; to know the habits of five birds that are found in the locality of the school; to write a composition having a quality of 80 on the Willing scale.

b. Initial score established. It is evident that in order to measure progress there must be a starting place as well as a goal to be attained. For example, such an initial score might be: the number of lines read per minute; the number of problems, of a given type, solved correctly; the number of words spelled correctly in an exploratory test based on the week's work; the number of right and wrong answers on a standardized test; the number of words typed per minute; or the quality of composition at the beginning of the term.

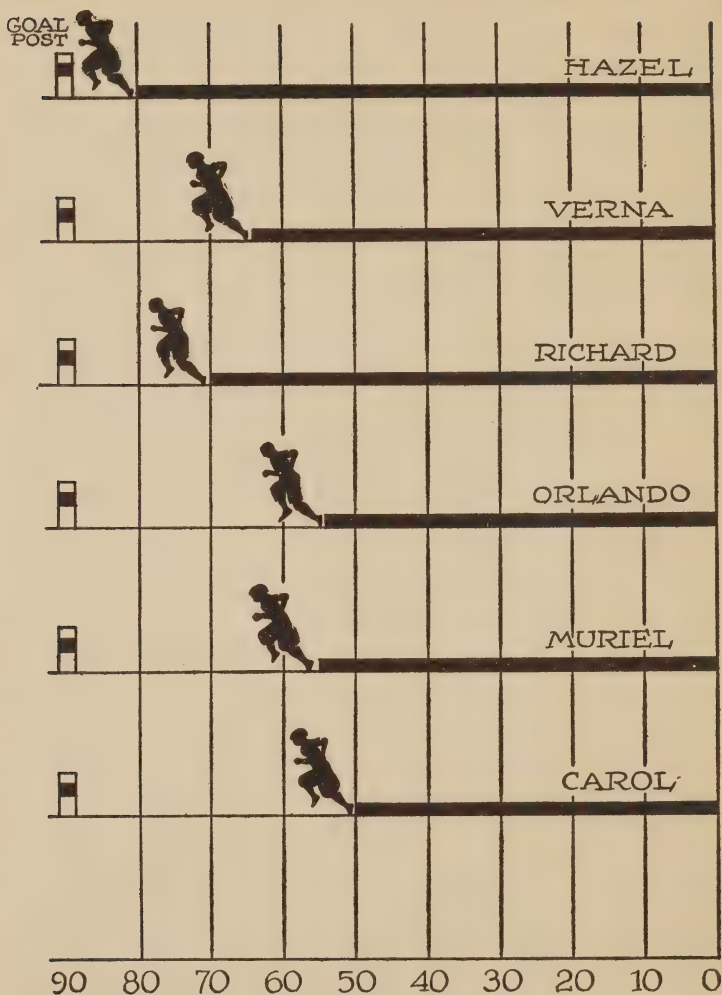
c. Extent-of-progress score. All pupils do not progress at the same rate. They are not all on the same level of development at the same time. At any given moment each pupil may be thought of as being somewhere along the line of a progress curve. The extent-of-progress score should show just how far the pupil has progressed toward attainment of the learning product. The extent-of-progress score should be derived in the same manner as the initial score. For example, if the initial score were based on the number of lines read per minute then the extent-of-progress score should also be based on the number of lines read per minute, using material similar or identical to that used in obtaining the initial score; if the initial score were based on the number of words typed per minute then the extent-of-progress score should also be based on the number of words typed per minute, using material similar or identical to that used in obtaining the initial score.

d. A graphical form. There are various forms of progress charts used. The particular form that any one teacher will use depends upon such variable factors as: the preference of the teacher; the nature of the learning product; the age and grade of the pupil; the means by which progress is measured; or the use made of the progress chart. In all instances, however, the progress chart should assume a graphical form that is easily made and understood by the pupil.

Illustration of a progress chart. Paulu gives an illustration of a progress chart which shows the progress made by six pupils toward an individual goal. The progress chart is in the form of a bar graph and is illustrated with figures running toward their goals. It is shown in Fig. 12.

This progress chart embodies the basic principles essential to a good progress chart. It has:

- a. A definite learning product for each pupil set up to be reached through activity.

FIGURE 12⁵

⁵E. M. Paulu, *Diagnostic Testing and Remedial Teaching*, p. 252. New York: D. C. Heath and Company, 1924. (Used with permission of the publisher.)

- b. An initial score established from which further progress can be measured.
- c. An extent-of-progress score established to indicate how far the pupil has progressed toward the learning product.
- d. A graphical form easily understood.

Examples of progress charts. Various examples of progress charts are reproduced in the pages immediately following. These are presented not as perfect examples but rather to direct the thinking of the teacher as she prepares progress charts for her own pupils. The forms which are shown include the following:

- a. Indication of task completed.
 - 1. Attendance in kindergarten.
 - 2. Free work record in grade III.
 - 3. Arithmetic in grade IV.
 - 4. Language exercises in elementary grades.
- b. Indication of right and wrong answers.
 - 1. Arithmetic in grade V.
 - 2. Spelling in grade III.
- c. Indication of the number of pupils missing each part of a test.
 - Spelling in grade VI.
- d. Indication of monthly scores.
 - 1. Arithmetic in grade IV.
 - 2. Reading in grade IV.
 - 3. Reading in grade V.
- e. Graphical representation of scores.
 - 1. Bank deposits.
 - 2. Reading in grade IV.
 - 3. Handwriting in grade V.
 - 4. Composition in elementary grades.
 - 5. Arithmetic in grade V.

a. Indication of task completed. 1. *Attendance in kindergarten.* Teachers in the kindergarten schools of San Francisco have experimented with progress records kept by pupils themselves. The records were charts made of common wrapping paper about a yard wide and a yard or two in length posted low enough for children to use.

In one school in which children were in the habit of coming in late, a record like the one shown in Table XL was posted upon the wall just inside the classroom door and the children were asked to put a mark in the proper space each day.

TABLE XL.—I GOT TO SCHOOL BEFORE NINE⁶

	MON.	TUES.	WED.	THUR.	FRI.	TOTAL
John.....	x	x	x	x	x	xxxxx
Mary.....	x	x	x	x	x	5
Susie.....	x	x	x	x		4
Etc. for 30 children						

The younger pupils put a row of marks in the column of totals, the more mature children writing figures.

It was believed that the right habit could best be secured through the child's satisfaction in marking on the chart himself and through seeing the record. The rest period, the lunch period, correcting habits of speech, choice of work, clean faces, shoes shined, all furnished opportunity for records of progress.

2. *Free work period in grade III.* Records more elaborate and more varied were kept in the primary grades. In the third grade, for example, the first record kept was of the free work period as shown in Table XLI.

⁶Julia L. Hahn, "Children's Participation in Record Keeping in Kindergarten and Primary Grades"; *Journal of Educational Method*, 6 (November, 1926), 126. (Quoted with permission of the editor.)

TABLE XLI.—A WEEK'S FREE WORK RECORD IN A THIRD GRADE⁷

	MON.	TUES.	WED.	THUR.	FRI.
Mary J.....	3 x	3 x	5 x	10 2	10
Ella M.....	8	8 x	11	11 x	14 15
Lucile M.....	2	10	10	10 x	2 1
John A.....	6	2 12	7	7 x	6
Alfred B.....	12	12	2	7	1
Etc. (36 children in class)	x	x	7	14	x

KEY TO MARKING

1. Made Christmas toy of wood.
2. Read a story.
3. Painted a good picture.
4. Learned the 4 x tables.
5. Wrote a good story on the board.
6. Worked on the poster.
7. Worked on the puppet screen.
8. Practiced writing the invitation to mother.
9. Prepared a story at home and read to class.
10. Sewed table cover.
11. Sewed bean bag.
12. Printed the newspaper.
13. Made doilies for lunch table.
14. Helped another child with numbers.
15. Played a word game.
- x. The activity was completed.

3. *Arithmetic in grade IV.* Brown reports the use of a progress chart in fourth-grade arithmetic. This chart was used by the individual pupil in connection with his lesson

⁷*Ibid.*, p. 127. (Quoted with permission of the editor.)

assignment. The chart was in reality a list of the activities, or learning products. Part of the chart is shown in Table XLII.

TABLE XLII.—ARITHMETIC IV

Long Division Types	O.K.	O.K.	O.K.
a. Without remainder $23\overline{)46}$	9-12-24	11-1-24	1-4-25
b. With remainder $31\overline{)57}$			
c, d, e, f, g, h, i, j			
Review previous fractions			
Reduction of fractions			
Types a, b, c, d, e			

(Remainder of sheet omitted, but follows the same form.)

As will be noted, opposite each topic three parallel columns are provided. When the work of any topic is taken up for the first time and the pupil attains a rank of eighty per cent in an oral or written test, he is given O.K. in column one. About a month later a review is given, and if a similar rank is attained, an O.K. is given in the second column. Later in the year, the work is again reviewed, and an O.K. is given for proficient work. Each O.K. is dated, as 9-12-24, to keep a check on the time which has elapsed between tests.⁸

The keeping of such a progress chart is a motive for good work as each pupil is required to watch his own progress. The competitive element will also enter as the pupil compares his progress with the progress of the other members of the group.

Whenever the pupil's work is 80 per cent or better the teacher O.K.'s the topic and the pupil goes on with the next topic assignment; if the pupil's work is below 80 per cent he receives supplementary work until he can attain a grade of 80 per cent.

4. *Language exercises in elementary grades.* Washburne reports the use of a progress chart in language exercises. This particular chart was used by the class teacher. It con-

⁸R. N. Brown, "Individualization in One-Teacher Schools in Connecticut"; *Twenty-fourth Yearbook of the National Society for the Study of Education*, Part II, p. 127. Bloomington, Illinois: Public School Publishing Company, 1925. (Quoted with the permission of the editor.)

Subject Language		Pupils' Names Alphabetically		Last Name	First Name
		Review Test			
		Possessives Test 1			
		Possessives Test 2			
		Possessives Test 3			
		Comma, Series			
		Comma, address			
		Comma, Yes, No, Or			
		Quot - Simple			
		Exclamations			
		Cap. Dcty			
		Paragraphs			
		Use of Dictionary			
		Review Test			
		92 Divided Quot			
		93 Indirect Quot			
		Review Test			
Anderson Roy	9/12/23	11/30/23	12/12/23	11/27/23	11/23/23
Atkins, Jack	9/12/23	11/23/23	12/12/23	12/12/23	12/12/23
Baldwin, Gladys	10/12/23	11/23/23	12/12/23	12/12/23	12/12/23
Baldwin, Gladys	10/12/23	11/23/23	12/12/23	12/12/23	12/12/23
Conroy, Charles	11/12/23	12/12/23	12/12/23	12/12/23	12/12/23
Cutting, Fay	11/12/23	12/12/23	12/12/23	12/12/23	12/12/23
Dart, George	11/12/23	12/12/23	12/12/23	12/12/23	12/12/23
Dart, Mabel	11/12/23	12/12/23	12/12/23	12/12/23	12/12/23
Douglass, Rena	11/12/23	12/12/23	12/12/23	12/12/23	12/12/23
Edley, Will	11/12/23	12/12/23	12/12/23	12/12/23	12/12/23
Elphinstone, Frank	11/12/23	12/12/23	12/12/23	12/12/23	12/12/23
Elphinstone, Frank	11/12/23	12/12/23	12/12/23	12/12/23	12/12/23
Elphinstone, Frank	11/12/23	12/12/23	12/12/23	12/12/23	12/12/23

FIGURE 13⁹

⁹Carleton W. Washburne, "A Program of Individualization," *Adapting the Schools to Individual Differences*, p. 261. Twenty-fourth Yearbook of the National Society for the Study of Education, Part II. Bloomington, Illinois: Public School Publishing Company, 1925. (Quoted with the permission of the editor.)

sisted of a class book with a list of the tests in language across the top of the page and a list of the pupils down the side of the page. When a pupil passed a test the date was recorded after that pupil's name and under the name of the test. Part of this progress chart is shown in Fig. 13.

Such a progress chart provides a picture of the progress not only of each pupil but also of the entire class. A short series of dates after the name of one pupil and a long series after the name of another pupil shows the second pupil to be farther advanced than the first. Such a progress chart plainly shows which pupils need special help, the extent of progress, and the points of seeming difficulty.

b. Indication of right and wrong answers. 1. *Arithmetic in grade V.* Table XLIII shows the progress chart of a girl, M. F., in arithmetic. A "v" mark indicates the example

TABLE XLIII.—RECORD OF M. F. IN ADDITION OF FRACTIONS¹⁰

NAME—M.F.	GRADE V									ROOM 156
EXAMPLES	NUMBER OF TEST									
	1	2	3	4	5	6	7	8	9	10
A	v	v	v	v	v	x	x	x	x	v
B	x	v	x	v	v	v	v	v	x	v
C	x	v	x	v	v	x	v	v	v	v
D	x	v	v	v	v	v	v	v	v	v
E	x	v	v	v	v	v	x	x	x	v
F	x	x	v	v	v	v	v	v	v	v
G	x	x	x	x	x	x	v	v	v	v
H	x	v	v	v	v	x	x	v	v	v
I	x	v	x	x	v	v	v	v	v	v
J	x	v	v	x	x	v	x	v	v	x
K	x	x	x	v	x	x	x	x	x	v
L	x	x	x	x	x	v	x	x	v	v
Score.....	1	8	6	8	8	7	6	8	8	11
Time.....	9	10	8	13	13	16	8	8	8	5

¹⁰A. W. Kallom, "Analysis of and Testing in Common Fractions"; *Journal of Educational Research*, 1 (March, 1920), p. 185. (Quoted with permission of the editor.)

was solved correctly; an "x" indicates that the example was solved incorrectly.

The first column shows her result on Test 1, the succeeding columns show her scores on Tests 2, 3, 4, etc. The problems in each test were of the following type in addition of fractions:¹¹

A. $\frac{3}{16}$ $\frac{7}{16}$	B. $\frac{5}{6}$ $\frac{5}{6}$	C. $\frac{2}{8}$ $\frac{4}{16}$	D. $\frac{3}{4}$ $\frac{7}{8}$
E. $\frac{1}{2}$ $\frac{3}{10}$	F. $\frac{6}{7}$ $\frac{9}{14}$	G. $\frac{2}{9}$ $\frac{7}{10}$	H. $\frac{1}{4}$ $\frac{8}{9}$
I. $\frac{3}{8}$ $\frac{7}{12}$	J. $\frac{7}{9}$ $\frac{9}{15}$	K. $\frac{1}{6}$ $\frac{7}{10}$	L. $\frac{5}{6}$ $\frac{3}{14}$

In test 1, M. F. failed in every type of problem except Type A. In the last test she failed on only one type, that being Type J. Such a progress chart is invaluable as it enables the teacher to determine at once where the pupil is having difficulty. Remedial instruction can then be applied at the point of error.

2. *Spelling in grade III.* Morrison has shown the progress made by thirty-two pupils, grade III, in spelling. Twenty-five words were given as a pre-test. These words were:

Almost	Blot	Barley	Strife	Silent
Blaze	Team	Cinder	News	Below
Alley	Ill	Brass	Case	Bullet
Races	Hump	Sweeten	Prairie	Preach
Lime	Skipping	Sign	Subtraction	Tender ¹²

The number of words missed by each pupil on the pre-test is shown in Table XLIV.

The words were taught and studied and another test, called the "Block Final Test" was given. The number of words missed on the final test by each pupil is also shown in Table XLIV.

¹¹*Ibid.*, p. 182. (Data used with permission of the editor.)

¹²H. C. Morrison, *The Practice of Teaching in the Secondary School*, p. 521. Chicago: University of Chicago Press, 1926. (Quoted with permission of the publisher.)

PROGRESSIVE PRACTICES

TABLE XLIV.—BLOCK FINAL TEST AND COMPARISON WITH PRE-TEST¹³

PUPIL	WORDS																									TOTAL MISSES		
	Almost	Ill	Sweeten	Subtraction	Blaze	Hump	Sign	Silent	Alley	Skipping	Strife	Below	Races	Barley	News	Bullet	Lime	Cinder	Case	Preach	Blot	Brass	Prairie	Tender	Team			
I.....	x o			x o			x o				x o			x o									x o	x o		7 o	A* B*	
2.....					x o					x o				x o					x o			x o	x o		x o	6 1	A B	
3.....			x o				x o																			2 o	A B	
4.....	x o			x o						x o	x o			x o												5 o	A B	
5.....				x o							x o															2 o	A B	
6.....					x o				x o														x o			3 o	A B	
7.....																										o	A B	
8.....				x o																			x o			2 o	A B	
9.....							x o	x o															x o			3 o	A B	
10.....			x o																		x o					2 o	A B	
11.....	x o		x o	x o	x o											x o		x o					x o			7 o	A B	
12.....	Absent																											A B
13.....																										o	A B	
14.....												o		x												o	A B	
15.....												x		x	x											2 o	A B	
16.....							x o				x o				o								x o	x o		4 o	A B	

*A—Pre-test.

*B—Block Test.

¹³*Ibid.*, p. 521. (Quoted with permission of the publisher.)

PROGRESS CHARTS

285

TABLE XLIV.—Continued

PUPIL	WORDS																									TOTAL MISSES	
	Almost	Ill	Sweeten	Subtraction	Blaze	Hump	Sign	Silent	Alley	Skipping	Strife	Below	Races	Barley	News	Bullet	Lime	Cinder	Case	Preach	Blot	Brass	Prairie	Tender	Team		
17.....														x								x			2	A	
														o								o			o	B	
18.....																						x			1	A	
																						o			o	B	
19.....																						x			1	A	
																						o			o	B	
20.....				x										o											1	A	
				o										x											1	B	
21.....				x	x																	x			3	A	
				o	o																	o			o	B	
22.....											x														1	A	
											o														o	B	
23.....																							x		1	A	
																						o			o	B	
24.....						x										x						x			3	A	
						o										o						o			o	B	
25.....				x	x	o		x			x			x		x		x		x		x			9	A	
				o	o	x		o			o			o		o		o		o		o			1	B	
26.....						o		x			x										x	x		x	5	A	
						x		o			o											o	o	o	1	B	
27.....				x										x		x									3	A	
				o										o		o									o	B	
28.....											x						x			x		x	x	x	6	A	
											o						o			o		o	o	o	o	B	
29.....						x				x													x		4	A	
						o				o													o		o	B	
30.....																x				x		x			3	A	
																o				o		o			o	B	
31.....											x					x						x			3	A	
											o					o						o			o	B	
32.....																							x		2	A	
																						x			1	B	
Total.....	3	o	7	8	4	o	8	1	1	5	7	1	o	7	1	5	1	3	o	4	o	3	20	1	3	93	A
	o	o	o	o	2	o	o	o	o	o	o	1	1	o	o	o	o	o	o	o	1	1	o	o	6	B	

c. Indication of the number of pupils missing each part of a test. *Spelling in grade VI.* Tidyman shows the progress made by a sixth-grade class in spelling during a period of three weeks. An exploratory test based on 24 words was given on the Friday preceding the week in which the words were to be

TABLE XLV.—SPELLING PLAN AND RECORD. GRADE VI.¹⁴
NUMBER OF ERRORS

WEEK OF FEBRUARY 14	PRELIM- INARY TEST FRIDAY	MON- DAY FEB. 14	TUES- DAY	WEDNES- DAY	THURS- DAY	FRI- DAY	REVIEW TEST MARCH 3
Number Present	44	40	40	40	40	40	43
courage	12	1				0	1
careful	3	0				0	2
which	1	0				0	0
their	3	1				0	3
there	2	1				1	2
business	10	2				2	1
service	18		1			1	3
servant	16		0			1	1
faithful	19		0			1	1
many	2		0			1	0
friend	7		0			2	0
since	6		0			0	2
explanation	21			4		2	4
attention	16			3		2	2
always	3			0		3	2
write	4			1		0	0
writing	8			2		0	0
once	1			0		0	0
declaration	36				3	1	4
description	20				2	2	10
vacation	20				1	0	3
doctor	7				0	0	2
often	14				0	0	3
automobile	22				5	0	2

¹⁴Willard F. Tidyman, *The Teaching of Spelling*, p. 145. Yonkers-on-Hudson: World Book Company, 1919. (Quoted with permission of the publisher.)

PROGRESS CHARTS

287

TABLE XLVI.—PROGRESS BY 20 PUPILS, GRADE IV, IN ADDITION, SUBTRACTION, AND MULTIPLICATION, COMBINED SCORES. SCORES EQUAL SUM OF RIGHTS IN COURTIS STANDARD RESEARCH TESTS IN ARITHMETIC.¹⁵

PUPIL	SUM OF RIGHT SCORES									TOTAL GAIN
	SEPT.	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	
1	13	15	13	16	..	23	31	35	38	25
2	1	6	9	18	17	14	31	34	37	36
3	13	16	15	25	22	20	31	41	32	19
4	11	8	10	19	21	..	23	34	31	20
5	5	6	12	16	18	18	25	29	28	23
6	2	5	12	11	11	12	21	20	28	26
7	4	4	11	15	15	12	20	28	24	20
8	4	5	8	7	12	12	25	26	23	19
9	9	7	14	15	13	15	20	23	22	13
10	5	3	9	10	14	14	18	21	20	15
11	9	13	12	17	13	8	21	22	18	9
12	7	7	6	8	5	7	16	16	17	10
13	3	6	3	7	8	5	14	19	17	14
14	1	2	4	8	10	9	14	21	17	16
15	6	10	5	7	..	12	18	6	16	10
16	0	0	3	4	12	7	10	13	16	16
17	0	4	5	6	2	10	5	8	10	10
18	0	7	5	4	9	6	..	11	9	9
19	3	2	..	11	12	4	9	..	9	6
20	4	3	2	0	4	0	0	11	6	2

¹⁵V. A. C. Henmon, "Improvement in School Subjects throughout the School Year"; *Journal of Educational Research*, 1 (February, 1920), 81. (Data used with permission of the editor.)

studied. The number of pupils who missed each word was entered on the record sheet. Six words were studied each day. After each day's lesson the number of pupils missing each of the six words that day was recorded. A review lesson was then given on Friday based on all the 24 words and once again the number of pupils who missed each word was recorded. Two weeks later the 24 words were again spelled and the number of mistakes recorded. This gave a record of progress covering a period of three weeks. The progress of the class toward attainment of the learning product is shown in Table XLV.

d. Indication of monthly scores. 1. *Arithmetic in grade IV.* Henmon reports the progress made in arithmetic by twenty

TABLE XLVII.—PROGRESS OF TEN PUPILS POOR IN RATE AND COMPREHENSION OF READING, FROM NOVEMBER TO MAY¹⁶

PUPIL	LINES PER MINUTE			COMPREHENSION OF IDEAS		
	NOV.	MAY	GAIN IN %	NOV.	MAY	GAIN IN %
34	5	11	120	1.5	6	300
35	5	10	100	1.5	2	33
36	5.5	11	100	0	2	...
37	5	8	60	3	6.5	117
38	4	7	75	2.5	6	140
39	4	20	400	2.5	7	180
40	4	6	50	2.5	2.5	0
41	...	19	...	3	7.5	150
42	...	24.5	...	2	5	150
43	...	5	...	2	2.5	25

¹⁶Bessie Waldman, "Definite Improvement of Reading Ability in a Fourth-Grade Class"; *Elementary School Journal*, 21 (December, 1920), 280. (Data used with permission of the publisher.)

pupils of grade IV during one year. The Courtis Standard Research Tests were given each month. The progress made by each individual pupil and by the class as a whole is shown in Table XLVI.

The significance of such a progress chart showing, as it does, individual differences is of timely value to both pupil and teacher.

2. *Reading in grade IV.* Waldman shows the progress made by ten pupils who were very poor in rate and comprehension of reading in grade IV. The instruction from November to May inclusive was adapted to their individual needs. The progress in rate and comprehension of these ten pupils, Nos. 34 to 43, is shown in Table XLVII.

3. *Reading in grade V.* Coffey reports the progress made by thirty-three pupils of grade V in silent reading. On October 3d the Monroe Silent Reading Test, Form I, was given. This was followed nine weeks later, December 5th, by the Monroe Silent Reading Test, Form II. The scores made by the pupils on each test, with gain in rate of reading and comprehension, are shown in Table XLVIII.

It was found that keeping a record of the scores caused the slow pupils to work and strive to reach a high mark in comprehension, while the faster pupils aimed for the honor of having the best record. After the first test was given on October 3d, each pupil was shown his record, which was then compared with the standard of the grade. During the nine weeks, all pupils showed great interest in the work, and toward the final test the question uppermost in the mind of each pupil was: "How will my work compare with that on the first test?"

e. **Graphical representation of scores.** 1. *Bank deposits (grade not given).* Paulu gives an illustration of a progress chart that shows the progress made by ten boys in their

TABLE XLVIII.—INDIVIDUAL RECORD SHEET¹⁷

I. Batiloro (teacher)

5-B Grade

	COMPREHENSION			RATE		
	FORM 1	FORM 2	GAIN	FORM 1	FORM 2	GAIN
G. H.	28.50	27.4	1.1*	124.08	123	1.08*
M. L.	22.80	27.4	4.60	103.84	123	19.16
J. M.	21.85	24.6	2.75	103.84	123	19.16
V. H.	19.95	29.3	9.35	124.08	123	1.08*
K. B.	19.95	27.1	7.15	86.24	123	36.76
B. W.	19.95	21.1	1.15	95.04	123	27.96
J. M.	19.95	27.1	7.15	95.04	123	27.96
J. F.	17.10	29.5	12.40	95.04	123	27.96
B. L.	17.10	26.7	9.60	86.24	123	36.76
R. G.	16.15	20.9	4.75	86.24	123	36.76
D. M.	16.15	21.1	4.95	95.04	113	17.96
H. C.	15.20	24.1	8.90	86.24	123	36.76
F. R.	15.20	26.0	10.80	95.04	123	27.96
V. R.	15.20	20.9	5.70	86.24	113	26.76
M. J.	14.25	25.4	11.15	86.24	113	26.76
M. W.	14.25	26.7	12.45	86.24	123	36.76
H. M.	13.30	24.4	11.10	76.56	123	46.44
W. G.	13.30	23.2	9.90	76.56	113	46.44
S. B.	12.35	17.7	5.35	86.24	103	16.76
F. B.	12.35	15.2	2.85	66.88	113	46.12
T. K.	11.40	21.1	9.70	66.88	103	36.12
B. C.	11.40	18.8	7.40	66.88	103	36.12
H. P.	11.40	29.5	18.10	88.00	113	25.00
J. R.	10.45	20.8	10.35	56.96	103	46.04
W. H.	10.45	21.1	10.65	58.96	113	54.04
A. F.	10.45	24.6	14.15	66.88	123	56.12
L. S.	9.50	15.7	6.20	51.92	90	38.08
H. T.	9.50	24.2	14.70	58.96	123	64.04
P. W.	7.60	23.9	16.30	66.88	113	46.12
A. B.	7.60	20.6	13.00	58.96	95	36.04
D. L.	4.75	13.6	8.85	38.72	76	37.28
D. S.	3.80	10.2	6.40	32.56	61	28.44
O. W.	10.45	21.1	10.65	58.96	103	44.04

*To the writer these scores seem to indicate a loss instead of a gain.

¹⁷Julia C. Coffey, *A Study of Silent Reading*. Philadelphia: John C. Winston Company, 1927.
(Quoted with permission of the publisher.)

bank deposits during two months. The chart is shown in Fig. 14.

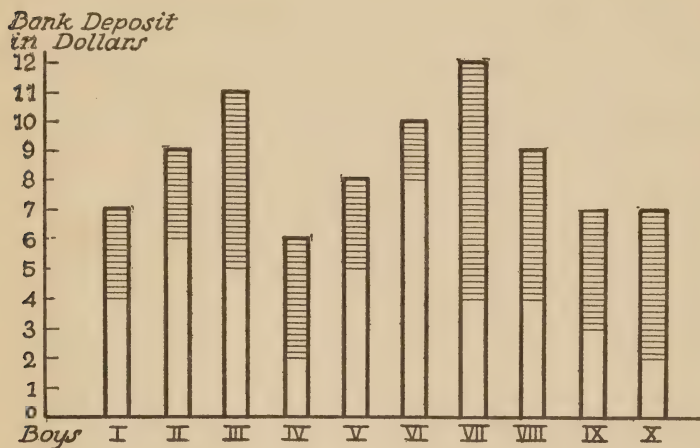


FIGURE 14¹⁸

Progress is shown by means of added portions. The chart is self-explanatory and can easily be adapted to any subject. It may be used to show the progress of an individual pupil or the progress of an entire class.

2. *Reading in grade IV.* Zirbes reports the results of an experiment in the reading of twenty boys of grade IV. In October the pupils were tested to ascertain the silent-reading rate of each pupil. The tests consisted of five silent-reading trials from which averages were obtained. The pupils were grouped into four groups: the "A" readers whose rate was more than thirteen lines a minute; the "B" readers whose rate was more than nine lines but not more than thirteen lines a minute; the "C" readers whose rate was between six lines and nine lines a minute; and the "D" readers whose rate was less than six lines a minute. The pupils knew their

¹⁸E. M. Paulu, *Diagnostic Testing and Remedial Teaching*, p. 45. New York: D. C. Heath and Company, 1924. (Used with permission of the publisher.)

reading rates and kept graphic records of their monthly progress.

The progress made by the class as a whole and by each individual member is shown in Chapter XI, pages 235-37.

3. *Handwriting in grade V.* Paulu gives an illustration of a progress chart used by a pupil in grade V to indicate his progress in handwriting. The chart is shown in Fig. 15.

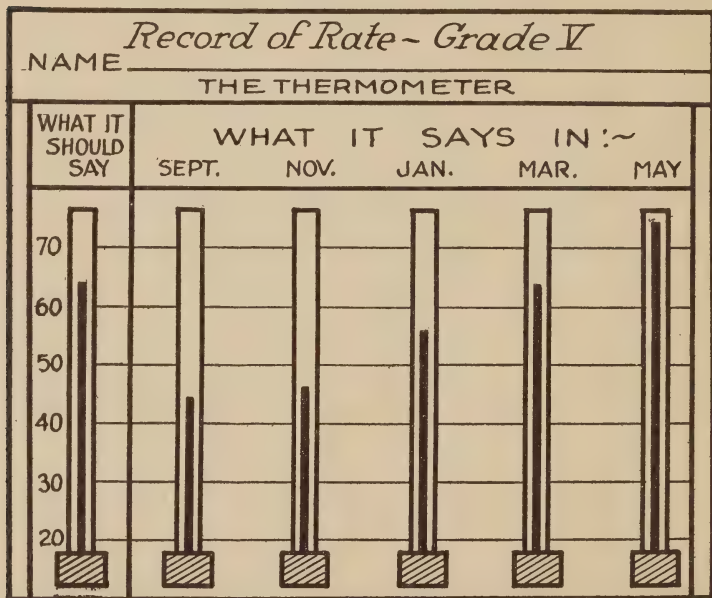


FIGURE 15¹⁹

The progress chart is in the form of a series of thermometers and the progress is shown by the rise or fall of the contents of the thermometer. The chart is self-explanatory

¹⁹E. M. Paulu, *Diagnostic Testing and Remedial Teaching*, p. 162. New York: D. C. Heath and Company, 1924. (Used with permission of the publisher.)

and can easily be adapted to any subject. It may be used to show progress of an individual pupil or the progress of the entire class.

4. *Composition in elementary grades.* Wohlfarth reports the use of a simple progress chart to show progress in composition work. The chart was used by the pupil for recording the results of successive measurements. The chart is shown in Fig. 16.

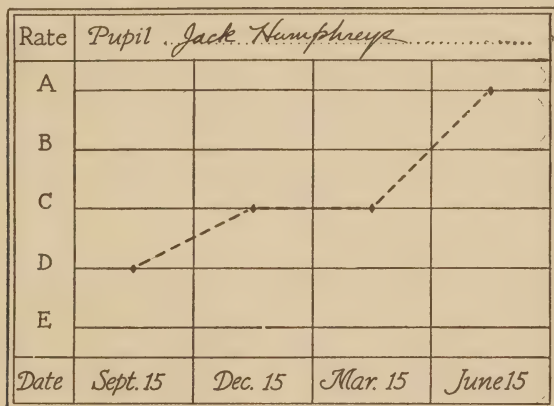


FIGURE 16²⁰

The letters A, B, C, D, and E refer to the five units of the composition scale that was used, A being the highest. The record shows that the composition written on September 15 was rated as a D composition; the one written December 15 was rated as a C composition, showing improvement; the one written on March 15 was rated as a C composition, showing no measurable improvement; the one written on June 15 was rated as an A composition, showing very marked improvement.

²⁰Julia H. Wohlfarth, *Self-Help Methods of Teaching English*, p. 276. Yonkers-on-Hudson: World Book Company, 1926. (Used with permission of the publishers.)

5. *Arithmetic in grade V.* Smith reports a progress chart used by a pupil in grade V arithmetic. The chart showing the progress made during four weeks is shown in Fig. 17.

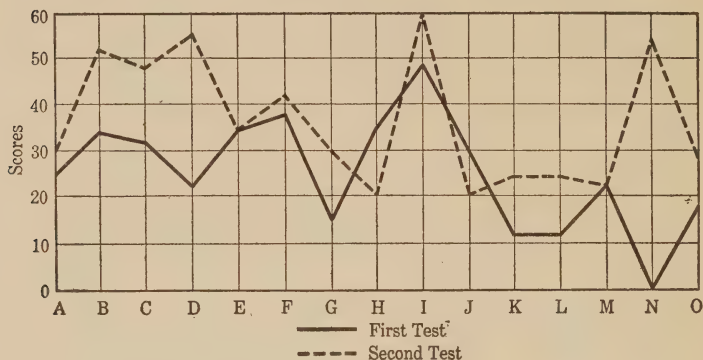


FIGURE 17²¹

A test consisting of fifteen problems designated on the chart as A, B, C, D, E, F, G, H, I, J, K, L, M, N, and O was given. At the end of four weeks the same test was repeated. The solid line represents the scores of the first test and the dotted line represents the scores of the second test.

SUGGESTIONS AND STUDY HELPS

Make a progress chart and answer the following questions:

1. What form did you find best suited to your subject and pupils?
2. Was the chart individual or group?
3. How did you set up the learning products as goals?
4. How did you establish the initial score?
5. How did you provide practice exercises? Were they group or individual?
6. How did you measure progress?
7. Of what practical value was the progress chart?
8. What were the reactions of the pupils to the chart?

²¹J. H. Smith, "Individual Variations in Arithmetic"; *Elementary School Journal*, 17 (November, 1916), 198. (Used with permission of the publisher.)

HELPFUL REFERENCES

- MORRISON, H. C., *The Practice of Teaching in the Secondary School*, p. 515. Chicago: University of Chicago Press, 1926
- PAULU, E. M., *Diagnostic Testing and Remedial Teaching*. New York: D. C. Heath and Company, 1924
- TRABUE, M. R., *Measuring Results in Education*. New York: American Book Company, 1924
- The Twenty-fourth Yearbook of the National Society for the Study of Education*, Part II. Bloomington, Illinois: Public School Publishing Company, 1925
- WOHLFARTH, JULIA H., *Self-Help Methods of Teaching English*. Yonkers-on-Hudson: World Book Company, 1926

INDEX

- Ability to do, 11; characteristics of, 12; improvement in, 12; individual differences in, 72; testing for, 173
- Ability to learn, 48
- Acceptance of worth, 14; characteristics of, 35; individual differences in, 87; testing for, 185
- Activity, æsthetic-situation, 37; intellectual-situation, 37; learning, 23; perceptual, 27; self-, 16
- Æsthetic-situation activities, 37
- Application, sustained, 207
- Association, use of, 143
- Attainment of learning product, 72
- Attainment test, 172; examples of, 173; for ability to do, 173; for acceptance of worth, 185; for understanding, 177; purpose of, 172
- Attention of pupil, 115
- Automatism, 25
- Ayres Handwriting Scale, 224
- Ayres Spelling Scale, 267
- Basic principle, in progress charts, 274; in testing, 171
- Behaving, ways of, 9
- Binet-Simon Test, 255
- Breaking down subject walls, 17
- Briggs English Form Test, 248
- Burgess Picture Supplement Scale, 243
- Burgess Silent Reading Test, 262
- Charts, diagnostic, 210; progress, 270
- Concept test, 77
- Conditioning learning, 197
- Content of, attainment test, 172; exploratory test, 99; test for ability to do, 99; test for acceptance of worth, 101; test for understanding, 100
- Contributory abilities, 18
- Contributory acceptances, 18
- Contributory understandings, 18
- Correct start, 52
- Correction of errors, 53
- Courtis Reading Test, 256
- Creative self-expression, 34
- Curve of progress, 275
- Deficiencies in education, 198
- Definition of learning, 9
- Demonstrations, 52
- Development, levels of, 70
- Diagnosis, 196; definition of, 196; group, 211; guiding principles of, 197; importance of, 196; individual, 239; methods of, 201; of pupil's needs, 212; references concerning, 210
- Diagnostic charts, 210
- Diagnostic sheet in arithmetic, 241
- Digits and poetry, 144
- Directed-learning questions, 132; examples of, 134; purpose of, 132; value of, 133
- Directing the learning activities, 48; methods of, 52; value of, 48

- Disabilities, mental, 198; physical, 200; psychophysical, 200
- Downey Will Temperament Test, 250
- Dramatization, 57
- Drill, 55; individual, 55
- Effectiveness, planning for, 58
- Emotional reactions, 199
- Emotional tone, 37
- Environment, 63
- Environmental conditions, 199
- Examples of, diagnosis, 211; individual differences, 72; learning activities, 23; learning products, 17; progress charts, 270; testing, 173
- Experiences, perceptual, 57
- Exploratory test, 97; content of, 99; examples of, 101; use of, 97; value of, 98
- Expression, self-, 34
- Extent-of-progress score, 275
- Evidence of learning product, 10
- Factors that condition learning, 197
- Failing pupils, 196
- Focussing attention of pupil, 115; methods of, 118; need for, 115; value of, 117
- Forgetting, 145
- Gray's Oral Reading Test, 257
- Gray's Silent Reading Test, 259
- Group diagnosis, 211; examples of, 211
- Healy-Bronner Learning Test, 255
- Hotz Algebra Scales, 215
- Identification with cause, 37
- Illinois Intelligence Test, 262
- Illustration of learning product, 10
- Imagery, visual, 27
- Imaginative participation, 37
- Increasing ease of learning, 143; methods of, 143; references concerning, 157; use of association for, 157
- Individual diagnosis, 269
- Individual differences, 70; examples of, 72; in ability to do, 72; in acceptance of worth, 87; in arithmetic, 72; in concept test, 77; in English, 80; in handwriting, 72; in leisure-time reading, 87; in progress, 74; in reading, 73; in spelling, 76; in understanding, 77; in vocabulary, 84
- Individualizing the learning activities, 90; basis for, 97; value of, 90
- Initial score, 274
- Intellectual-situation activities, 37
- Intensifying the presentation, 153
- Intensity, 154
- Interest in school museum, 159
- Knowledge, of learning product, 17; of progress, 56
- Law of association, 143
- Learning, ability for, 48; defined, 9; factors that condition, 197; nature of, 9
- Learning activity, automatism of, 25; continuation in, 25; correct start in, 25; definition of, 23;

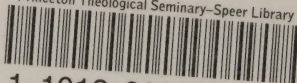
- examples of, 38; kinds of, 24; nature of, 23
- Learning curve, 71
- Learning products, 9; attainment of, 72; contributory parts of, 18; definition of, 10; evidence of, 10; examples of, 18; focussing attention upon, 115; illustration of pupil activity, 16; presentation of, 118; progress toward, 270; references concerning, 22; setting up, 17; testing for, 171
- Length of drill period, 150
- Levels of development, 70
- Life situations, 55
- Line of progress curve, 275
- Malnutrition, 200
- Mental disabilities, 198
- Mental set, development of, 58
- Methods of work, 198
- Monroe Silent Reading Test, 230
- Movement melody, 12
- Moving pictures, 57
- Museum, 159; care of, 160; interest in, 159; material for, 159; value of, 161
- Nature of learning, 9
- Nature of learning activity, 23
- New way of behaving, 9
- Nonsocial qualities, 199
- Number of repetitions, 149
- Object teaching, 57
- Observing relationship, 147
- Outcome, pleasurable, 56
- Perception, visual, 58
- Perceptual experiences, 57
- Perceptual learning, 27
- Performance, pupil, 53
- Personal acceptance of worth, 14
- Personal relationship, 36
- Personality, development of, 34; integration of, 35; traits of, 199
- Personality traits, 199
- Physical disabilities, 200
- Planning for effectiveness, 58
- Pleasurable outcomes, 56
- Poetry and digits, 144
- Presentation of learning product, 118; examples of, 119; intensity of, 153
- Pressey Punctuation Test, 226
- Products, learning, 17
- Progress, methods of showing, 270
- Progress charts, 270; basic principles of, 274; examples of, 277; illustration of, 275
- Progress curves, 275
- Progress toward learning product, 270
- Prose, 145
- Providing learning activities, 23
- Psychophysical disabilities, 200
- Pupil performance, 53
- Pupils, failing, 196; study of, 200
- Purpose of testing, 171
- Rate of forgetting, 145
- Reading, for recreatory purposes, 30; for work purposes, 29
- Recognizing individual differences, 70
- Record of progress, 209
- Recreatory reading, 30
- Relating to pupil's interests, 152
- Relationship, personal, 36; use of, 147

- Remedial instruction, 207; value of, 207
 Remedial work, 215
 Repetition, 54; amount of, 149
 School museum, 159
 Scores, extent-of-progress, 275; initial, 274
 Self-expression, 34; form of, 34; technique of, 64
 Sentences and words, 143
 Separate training, 53
 Setting up learning products, 17
 Showing progress, 270
 Slides, 153
 Social qualities, 199
 Social-situation activities, 36
 Specimens, 160
 Stanford Achievement Test, 267
 Stereoscopic slides, 153
 Study directions, 244; in algebra, 244; in English, 254; in history, 246
 Study of pupil, 200
 Subject walls, 17
 Sustained application, 207
 Tabulation of scores, 212
 Testing, 171; content of exploratory test, 172; evidence of learning product, 172; form of questions, 171; purpose of, 171
 Tests for exploration, 97; content of, 100; examples of, 101
 Tests of ability to do, 173; content of, 173; examples of, 174
 Tests of acceptance of worth, 185; content of, 185; examples of, 186
 Tests of attainment, 172; content of, 173; examples of, 173
 Tests of understanding, 177; content of, 177; examples of, 177
 Thorndike-McCall Reading Scale, 249
 Thorndike Visual Vocabulary Scale, 257
 Transformation of meaning, 14, 143
 Transformation of processes, 9
 Types of learning products, 11
 Understanding, 13; activities that produce, 27; characteristics of, 14; evidence of, 14; individual differences in, 77; testing for, 177
 Use of directed-learning questions, 132
 Value of, directed-learning questions, 132; focussing attention, 117; knowing progress, 270
 Views, stereoscopic, 51
 Visual aids, 158
 Visual devices, 158
 Visual imagery, 27
 Visual material, 158; definition of, 158; growth of use, 158; references concerning, 170; use of, 158; worth of, 166
 Visual perceptions, 58
 Walls, subject, 17
 Ways of behaving, 9
 Willing Composition Scale, 218
 Will-temperament traits, 199
 Wilson Language Error Test, 229
 Woodworth-Mathews Test, 256
 Woody Division Scale, 211
 Words and sentences, 143
 Work, methods of, 198; reading, 29; remedial, 215
 Worth, acceptance of, 14

LB1025 .P17

Progressive practices in directing

Princeton Theological Seminary-Speer Library



1 1012 00064 1243